No. 1871 Vol. XLVI NOVEMBER 2nd, 1944

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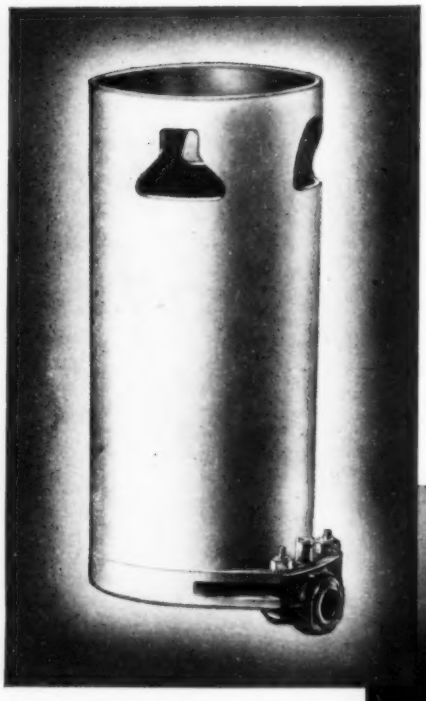

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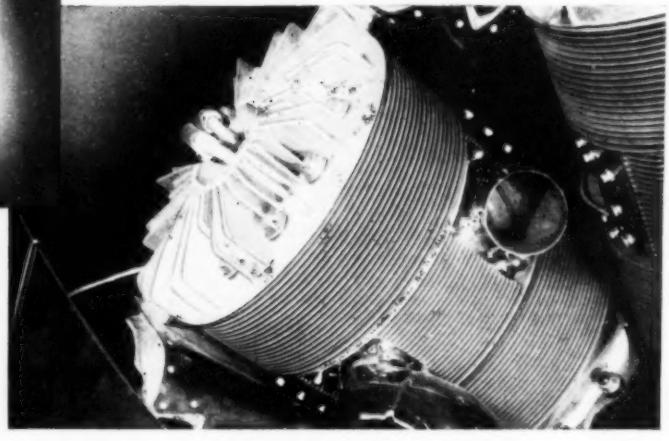

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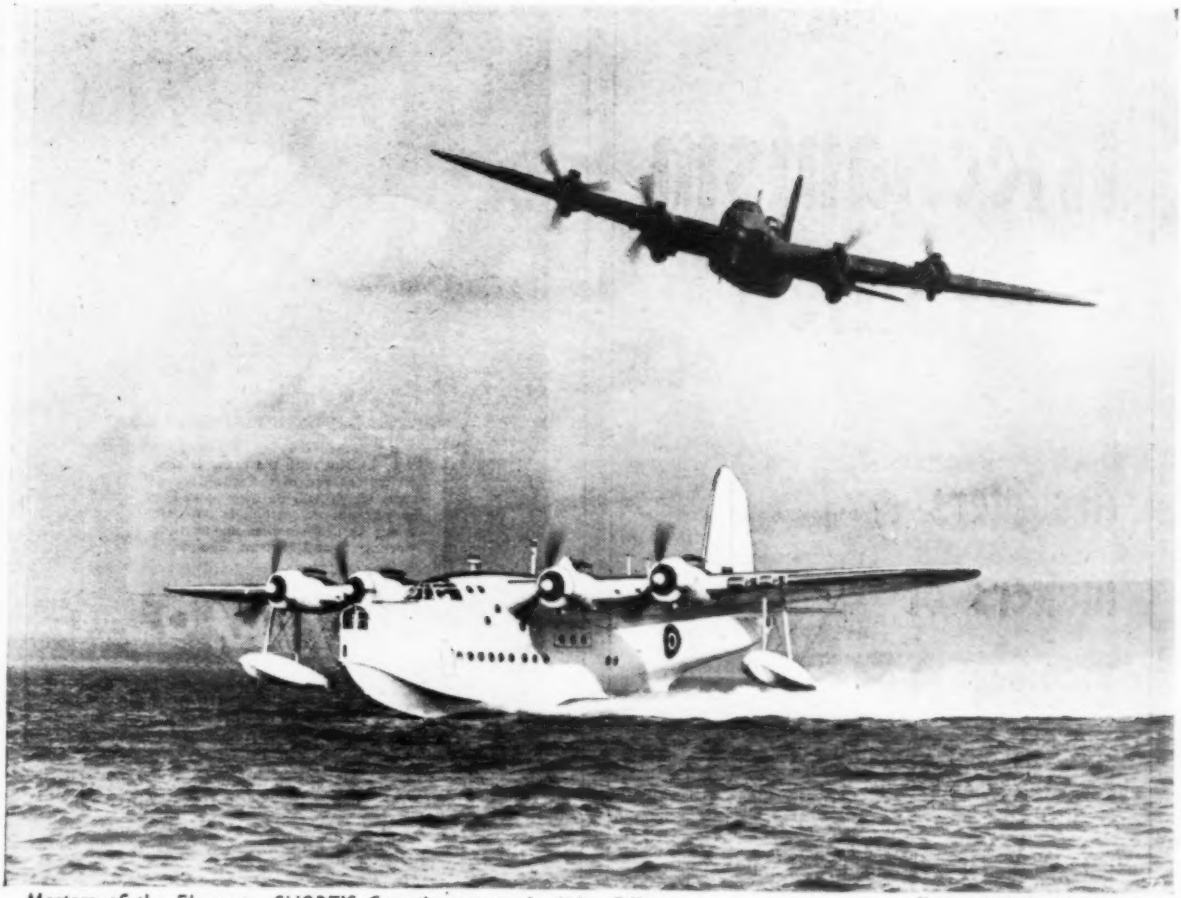

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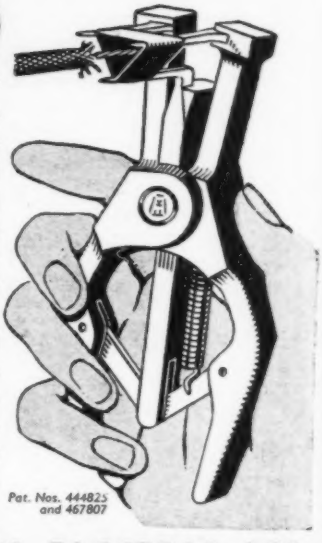

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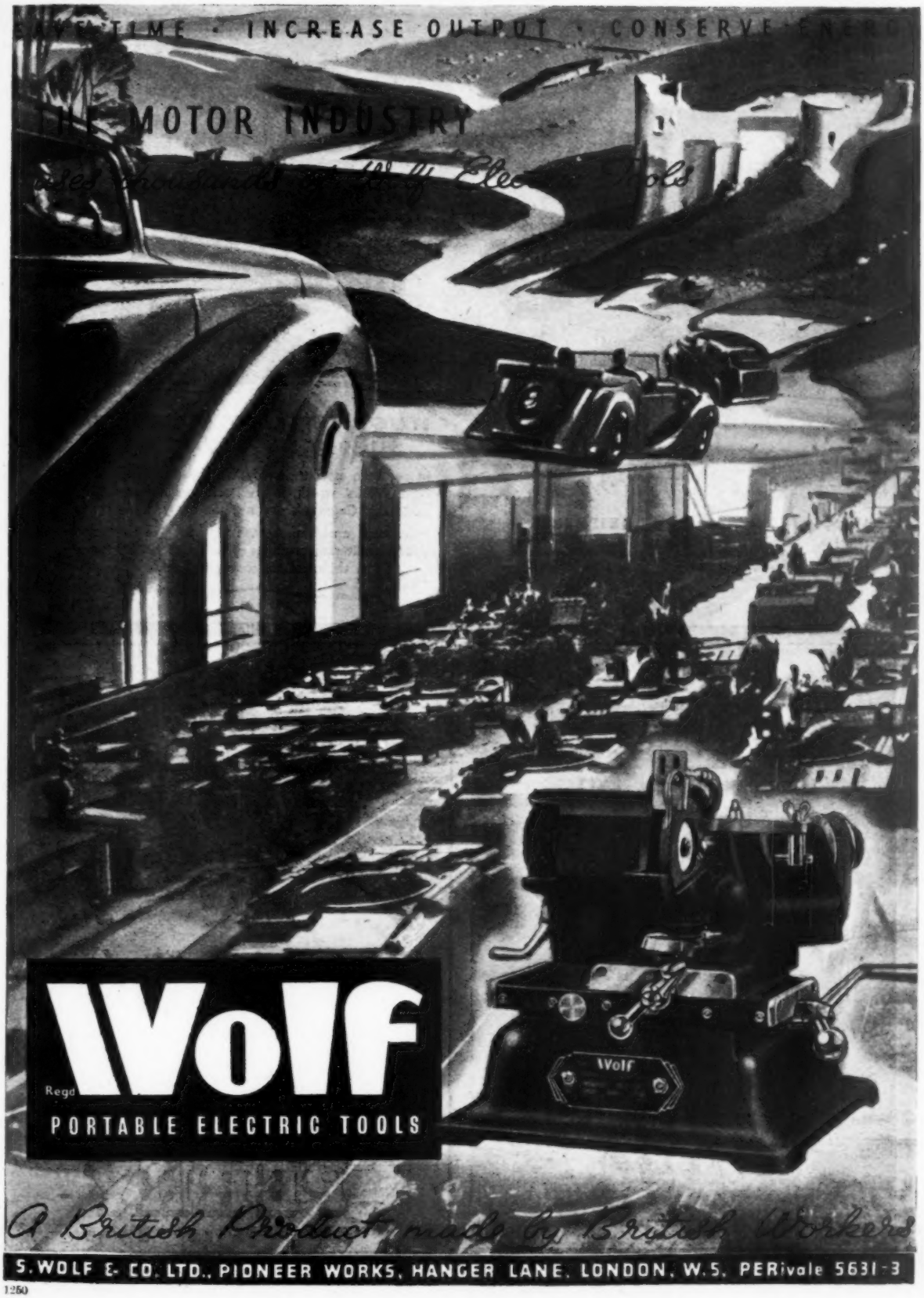
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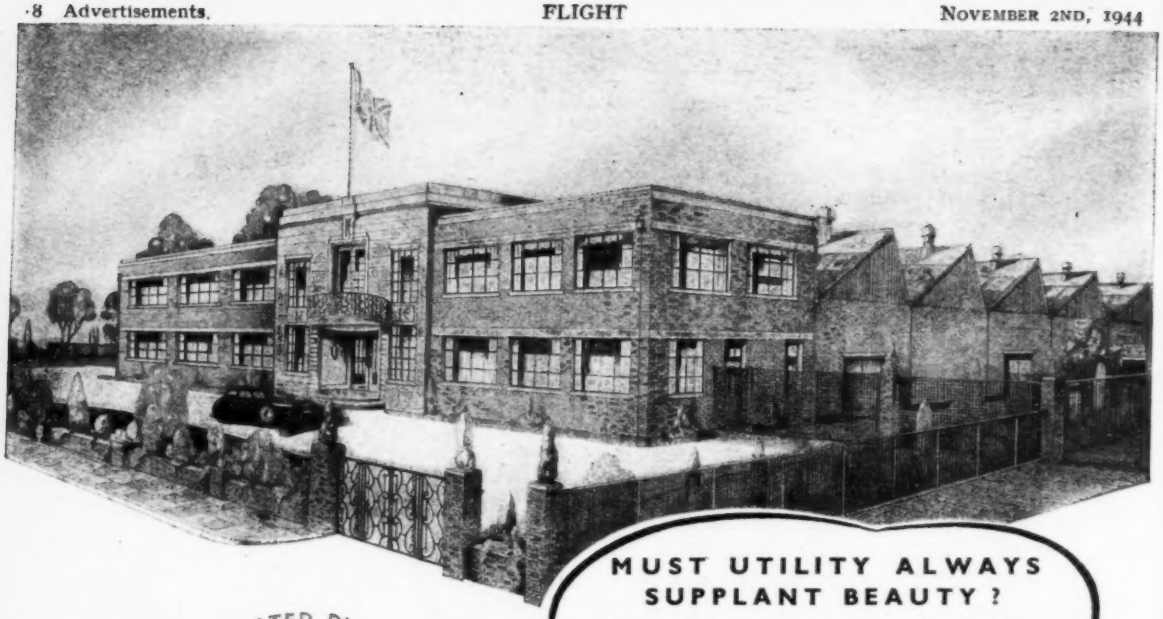

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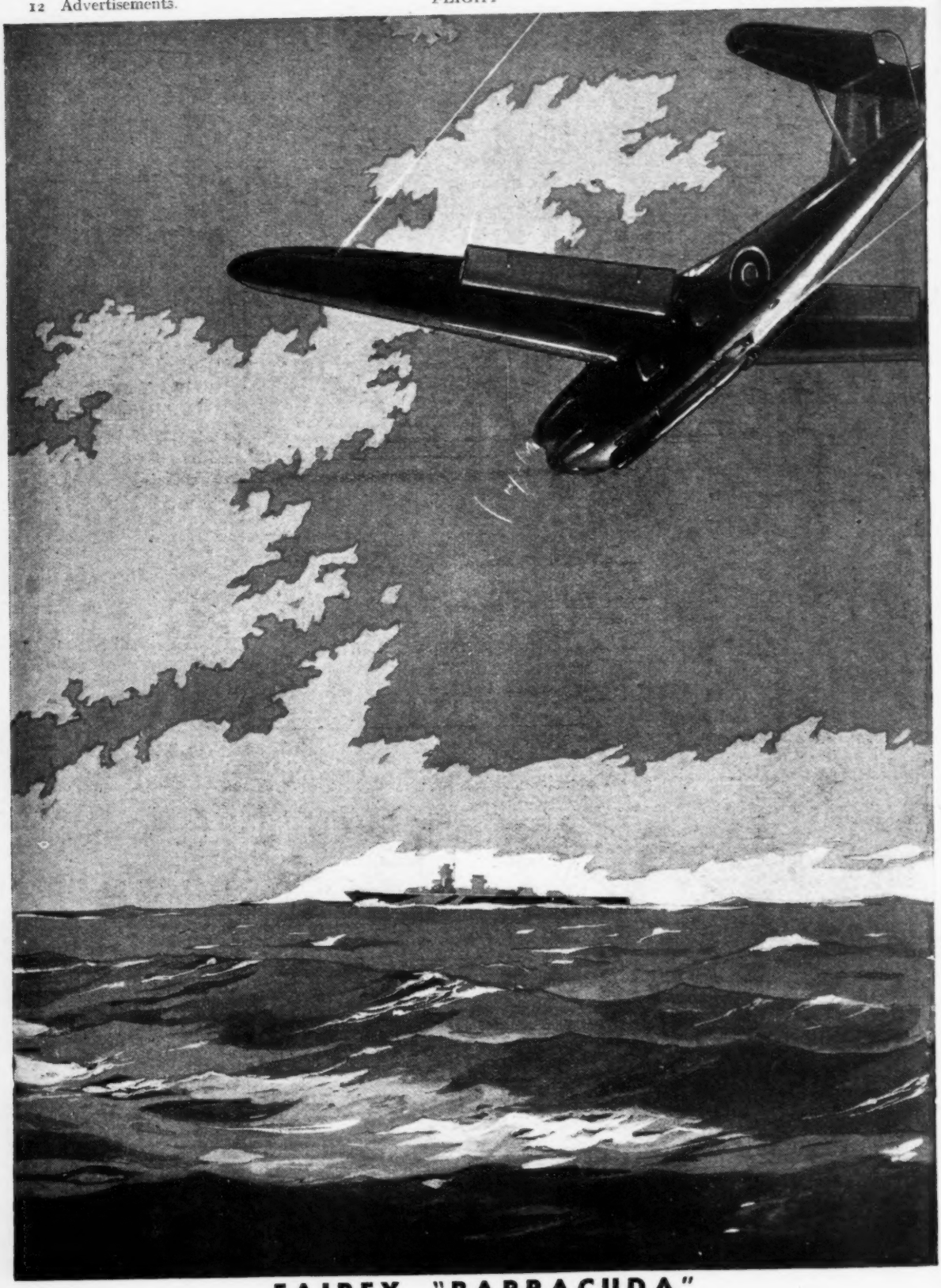

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FLIGHT
and
AIRCRAFT ENGINEER

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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The Outlook

Unbalanced Forces

THE picture we see continually before our eyes in this global war impresses upon the mind the need for keeping our forces balanced. This does not mean that available manpower should be split exactly into three and divided between the R.A.F., the Navy and the Army. It means that the brains which direct this war need to be very far-seeing in view of the complexity of modern arms, and the fact that the time required for training men to use them precludes the use of last-minute changes.

There is also a balance to be carefully preserved within each of the Services and, undoubtedly, the High Command of the R.A.F. has shown a faith and an ability which are now paying a thousand-fold dividend. What other Command would have had the courage to stand by its decision to build up a tremendous heavy bomber force at a time when it appeared as if we had not enough fighters to keep the Germans out of our sky? That bomber force can now, by virtue of its work by night through years of tough going, go in daylight over areas most vital to the enemy and drop thousands of tons of bombs in a matter of minutes. The losses from these tremendous operations are extremely low—sometimes less than one per cent.

In this regard there has been somewhat of a miscalculation in that our command catered for much heavier losses. Actually we have trouble because many young men who had set their hearts on becoming aircrew are now directed to the Army or the mines. Let us, nevertheless, be utterly thankful.

What is the picture from the other side of the lines? Nothing but miscalculation and incompetence. When the tide turned against Germany, bombers gave way to fighters in their factories, with the result that the *Luftwaffe* lost nearly all its striking force and became entirely unbalanced in its ratio of offence to defence. Because the German High Command thought of air power as an extra army weapon only, German bombers, even in their heyday, had neither the range nor the weight-carrying capacity to carry out strategic bombing. Politics were allowed to interfere with target decisions and, since the political regime in Germany decided that killing civilians would win the war for them, our factories, rail centres, power houses and other vital targets were, in the main, untouched.

How deep is the division between the German political bosses and the military authorities can only be guessed That it is very deep cannot be doubted. The most illuminating evidence we have of this showed up on the Continent just before the invasion. The Nazi war bosses ordered V1 and V2 sites to be built on the Continental littoral as fast as the Todt organisation could construct them. At the very same time the *Luftwaffe* was ploughing up airfields within twenty miles of the coast, and preparing for demolition by mining the runways of many other landing grounds further inland.

International Aviation

GREAT issues are being settled at the international conference on civil aviation which opened at Chicago yesterday. True, any agreements reached will have to be ratified by the different governments, but it is to be expected that the vast majority will be so ratified, and so at Chicago the future of international civil aviation for many years to come hangs in the balance. Air transport can and should play an extremely important part in the rehabilitation of the world after the present upheaval. It can be a tremendous power for good and strong in sustaining the peace, once that has been won. It can also, if handled unwisely, be a constant source of irritation and even a

potential cause of war. Everything will depend upon the degree of give and take which delegates to the Chicago conference are prepared to accept.

This is fully realised in some, although by no means in all, American quarters. For instance, an editorial in the *New York Herald Tribune* after commenting that the British White Paper does not shut the door on amicable negotiations but leaves the position as it was in the April discussions between Lord Beaverbrook and Mr. Adolf Berle, remarks: "The controversy has explosive possibilities unless both nations approach it with the proper perspective, which is that, far more important than the capture of an advantage, one over the other, in this undoubtedly vital field, is the preservation of unity and the creation of a reliable peace."

On the other hand, there are powerful interests in America which reject, for instance, the international authority to allocate routes and schedules and fix fares suggested in the British White Paper. The *New York Journal of Commerce*, for example, urges that the American Government, through their delegates to Chicago, must insist on the right of American flag aircraft to fly to any country which will permit them to land, without restriction as to frequency of flight or fares to be charged. It contends that the international authority suggested in the British White Paper could limit competition to an extent that would interfere with the realisation of the full post-war possibilities of international air transport. In Great Britain, too, we have those who do not think the best interests of international air transport would be served by a governing international authority, although the Governments of the British Empire appear to favour such a body.

There is much to be said on both sides, and to come to a workable compromise will tax the ingenuity and good will of the Chicago delegates to the utmost. That a solution can be found which will prove universally satisfactory is too much to expect. The main task of the conference will be to reduce dissatisfactions to a minimum. Some degree of international control appears to be essential if we are to avoid the scramble for advantages that would inevitably arise if countries were left to make bi-lateral agreements between one another. Such agreements might well result in the "freezing-out" of nations capable of and entitled to take their part in the world's network of airlines. It should be a major guiding principle that all the nations, large and small, should be permitted to contribute, to whatever degree they usefully could, to the common fund of benefits which good air transport can bestow.

The absence of Russian delegates from the Chicago conference will make it even more difficult to formulate any policy which includes international regulation since there will inevitably be some doubt as to whether any agreement reached by the other delegates will be acceptable to Russia.

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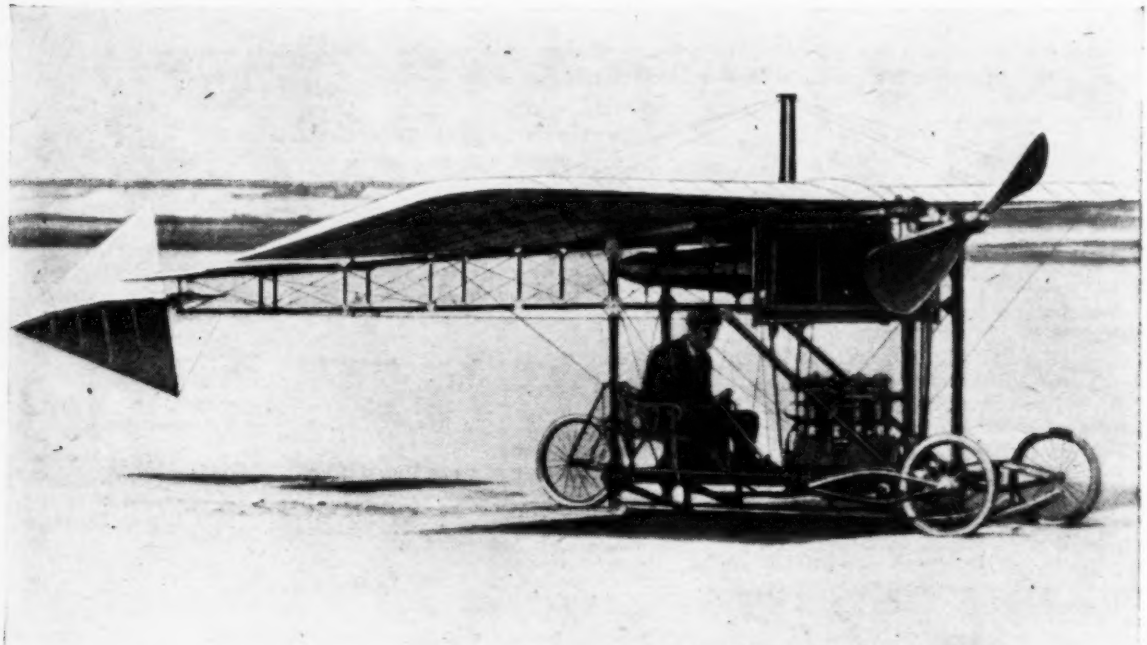


A 1909 FLYING MACHINE: Mr. Robert Blackburn in the pilot's seat of his first monoplane, which he flew and crashed on Saltburn Sands as recorded on p. 471.

WAR in the AIR

The Sea-Air Battle in the Philippines : The Bomber Offensive Still Grows : Russians in Norway

AT the moment of writing the great sea-air battle in among the Philippine Islands is still raging. Once more it seems to be fought out mainly by the aircraft carriers on both sides. Japanese battleships were reported as present in all the three fleets which came up from different directions to attack Admiral Halsey's 3rd Fleet. Whether this means that at last the Japanese Admiralty has decided that the time has come to risk everything in the effort to stem American progress is not yet clear. It has always seemed to us that that time must come; but the Japanese may not have intended to fight their Trafalgar just yet. It is quite as likely that their hands were forced by the thrusting tactics of the Americans.

From the first reports it appears that the Japanese battleships did not get within gun range of the American fleet, but were damaged by bombs and torpedoes while still at a distance. Further news will probably come to hand before this article is closed, and all that can safely be said at the moment is that things have been going very badly for the enemy.

Still Heavier Bombing

AS the United Nations press in on them from all sides, from Aachen to East Prussia, the German people must be appalled to see how the weight of the Allied air offensive grows. When the German armies were marching victoriously ahead, or even holding their enemies at a distance from the Fatherland, one could understand the Germans bearing up against the air attacks with fortitude. In fact we expected that they would. Doubtless they felt that though individuals might suffer, Germany was all right, and the ultimate victory of the Führer's intuitions would presently remove their afflictions and wreak vengeance on their enemies. Now that longed-for prospect must seem very remote, while the British and American bombers, in ever-increasing numbers, batter the German seats of industry at will, by day as well as by night.

One day last week, for example, about 2,200 bombers struck at targets in the Reich. R.A.F. Bomber Command had out a full 1,000 which attacked Essen and a synthetic oil plant at Homberg. Essen, once the centre of Germany's military pride, had never before been so heavily attacked in daylight by the R.A.F. The Germans could not even find consolation in the thought that the raid had been expensive to the British. No *Luftwaffe* fighters went up to meet the bombers, and the *flak* only succeeded in bringing down four of the assailants. The Americans sent out 1,200 Fortresses and Liberators on the same day. The great railway yards at Hamm were the principal target. Dislocation there is likely to have a quick effect on the battles on the frontier. Oil refineries and synthetic oil plants were also attacked by the Americans, and it is obvious that oil is now one of Germany's major problems. Again no *Luftwaffe*

(Above). THREE OF A KIND: A section of Tempests of Fighter Command in echelon to starboard.

(Below). LOADING THE LIB.: Bombing-up an R.A.F. Liberator with incendiary and high-explosive bombs at an Indian bomber base.

WAR IN THE AIR

fighters put in an appearance, and Gen. Spaatz's force only suffered the loss of two bombers and one fighter.

Not very long ago these heavy raids used often to cost the attackers 40 or more bombers; but even then the decision was to persist, as the heavier the attack, the sooner the war would be over. Now the heaviest of all day efforts has only cost the Allies seven machines. The loss to the enemy will probably be reckoned on the battlefield even more poignantly than in the factories.

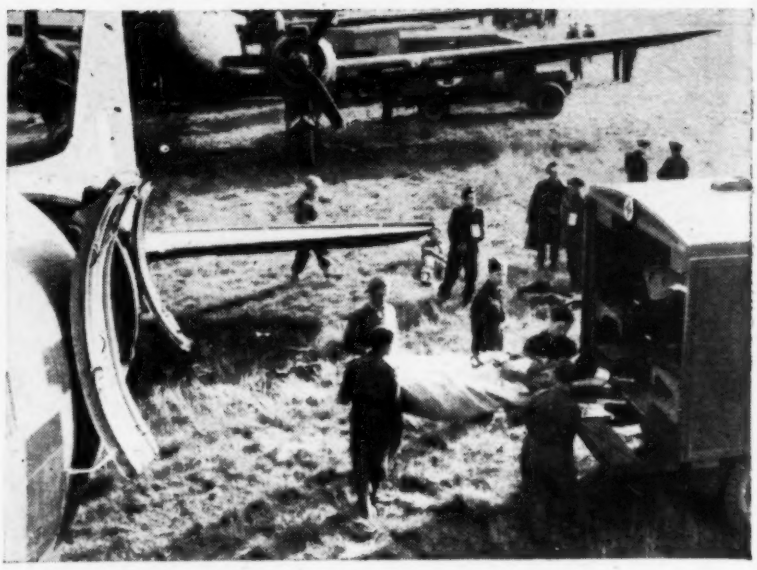
Kirkenes Captured

IN the early days of the war probably few people would have foreseen that the first help to reach unfortunate Norway from one of the major Allies would have been afforded by the Russians. In the last World War, it may be remembered that the Swedes cherished a historic fear of the Russia of the Tsars, which may have dated from Charles XII's invasion of Russia and his defeat by Peter the Great at Poltava, or even earlier. This sentiment inclined the Swedes to a pro-German sympathy until the German submarines took to sinking Swedish ships. Norway, on the other hand, while maintaining strict neutrality, was undoubtedly well-disposed towards the original Alliance of Britain, France and Russia. There was certainly no anti-Russian sentiment in the country.

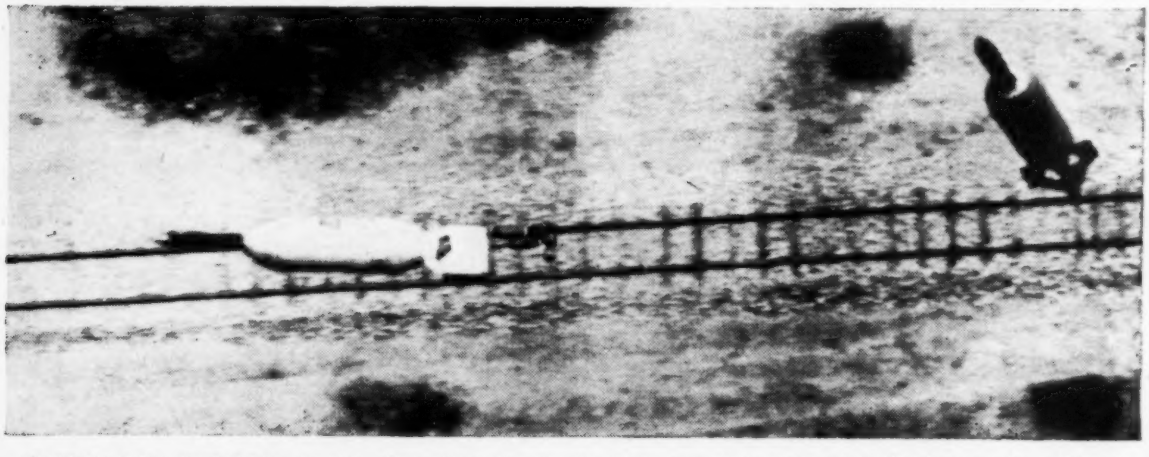
Now the surrender of the Finns and their handing over to Russia of the port of Petsamo has given the Red armies a chance to break into northern Norway, and they have seized the town and port of Kirkenes. It is an important port, and there are airfields round it. It is also a main base for U-boats in northern waters. Its possession by the Russians should help to mitigate the hardships and risks suffered by our convoys as they carry munitions to Russia. The King of Norway has urged all his subjects to help their Russian Allies, and has announced that Norwegian forces would fight beside them.

There is not much doubt that in recent months the Germans have been withdrawing troops from Norway to meet the attacks on the Reich from other quarters. The advance of a Russian army into that country has evidently increased their apprehensions. There seemed a real danger that the damaged battleship *Tirpitz* might be captured by the Russians at her moorings in Alten fiord. Though damaged by British submarines and aircraft and unfit to fight, the vessel is still able to move. So the Germans, according to firm reports from Stockholm, have moved her from Alten fiord to Tromso, and are preparing to take her still further south. If they do, she will come within still easier range of British aircraft. The *Tirpitz* is not likely to end her days as her sister ship the *Bismarck* did, and go down with colours flying and guns firing to the last; but still it would be a satisfaction to the Fleet Air Arm if they could send her to the bottom, even in a Norwegian fiord.

The weather on the Western front has of late not been too favourable for air operations. Still, whenever there is a chance of doing good work the Allied Expeditionary Air Force gets machines into the air. The soldiers must envy the air crews, who, once they have left the ground, are free from the mud and floods which are



ERRANDS OF MERCY: Dakotas of R.A.F. Transport Command being loaded with casualties at an advanced airfield in Belgium. Since D Day over 40,000 cases have been flown back to hospitals in Britain by the R.A.F. alone. The total number of cases is over 103,700.



ROUSING THE SLEEPERS: Special railway-destroying bombs being dropped by the 10th U.S.A.A.F. on the metals at Ywataung near Mandalay.

WAR IN THE AIR

now prevalent in the Low Countries. The airfields are doubtless situated in the most favourable bits of country that can be found; but the ground crews must have to endure lots of discomfort from the wet.

Latest Reports

THE latest reports to hand confirm the completeness of the American naval victory in the Philippines. The Prime Minister, in a congratulatory message to President Roosevelt, described it as a "brilliant and massive victory." Admiral Nimitz at Pearl Harbour has announced that 59 or 60 Japanese warships took part in the fight, and that of them only one destroyer, or perhaps two, escaped damage. The Japanese had 11 battleships in the action, of which two, the *Huso* and the *Yamasiro*, each of over 29,000 tons, were sunk, and the other nine were damaged—though no estimate of the degree of damage has yet been made. The report does not state how many Japanese carriers were engaged, but says that four of them, as well as six heavy cruisers, were among the 24 enemy ships sunk. In addition the Japanese are said to have lost 171 aircraft. Six American warships were sunk.

These figures certainly represent a smashing blow to the enemy in the Pacific. As Mr. Churchill said in his message, we are proud to know that one of His Majesty's Australian cruiser squadrons had the honour of taking part in the battle. The Australian ships were evidently in the thick of it, for their flagship, H.M.A.S. *Australia* had her bridge destroyed and her captain killed.

In due course we shall doubtless learn more about the battle. Tactically the chief interest seems to lie in whether the majority of damage was done by aircraft or by the guns of the ships. It seems certain that each of the three divisions of the Japanese fleet was attacked at a distance by American aircraft, and suffered from their bombs and torpedoes. Whether the battle then closed up, and the big guns of the warships came into action against each other we shall doubtless learn in time.

There has, as yet, been no mention of American battleships being present. If there were none, or only a few, that may well have influenced the enemy's decision to bring his powerful force of 11 battleships into the comparatively narrow waters among the Philippine islands, which would seem on the face of it to be bad naval tactics. He may have thought that this would be offset by the possibility of allowing shore-based aircraft from the islands to take part.

AERIAL BAPTISM: Two headmen of the Naga hillmen try a new mode of travel in an Avro Anson operating from an R.A.F. airfield on the Burma front.

One thing is certain. The Americans have become experts at using the aircraft from their carriers to attack enemy fleets while they are still at a distance, and so to reduce their strength before a gun battle can be joined. The Japanese lost four carriers, and presumably had others present. In addition, shore-based aircraft may have taken part in the battle. But there seems no doubt that in the air the Americans had things very much their own way.

The Japanese have the disquieting thought that the British are building up in the Indian Ocean a fleet strong enough by itself to engage the whole naval power of Japan. Our experiences in the Mediterranean have taught us a lot about the use of carriers in conjunction with a fleet, and Mr. Churchill has arranged with President Roosevelt that the Americans are not to have "all the fun" of beating the Japanese in the Pacific. It may well be that the landing craft which Admiral Mountbatten wanted a long time ago may now be on their way to Trincomallee to take part in combined operations.

After her move from Kirkenes to Tromso, the *Tirpitz* did not have to wait long before Bomber Command were after her again. Last Sunday the Lancasters were out, facing a round flight of 2,400 miles and carrying 12,000-lb. bombs on the outward journey. At least one of the "earthquake bombs" scored a direct hit; while a number of near misses in shallow water would be likely to leave their marks on the battleship. The German fleet in the Baltic is still fairly formidable, though the addition to it of the damaged *Tirpitz* would not add to its fighting strength. One can understand, however, that to have a battleship captured by a Russian land Army would be humiliating.

TROUBLED OIL ON THE WATERS: A German oil tanker in the Skagerrak bursts into flames as it is attacked by R.P. Beaufighters of Coastal Command.

HERE AND THERE

PRIVATEER'S PROGRESS: Following the modern fashion, the Vought-Corsair has now emerged as a fighter-bomber, carrying a brace of 1,000-lb. missiles side-by-side under its centre section.

Appointment

THE Air Ministry has announced the appointment of Acting Air Cmdre. Albert Fletcher, C.M.G., C.B.E., M.C., to be Deputy Senior Air Staff Officer on liaison with B.O.A.C., H.Q. Transport Command.

Back in Civvy Street

WING CDR. J. C. CANTRILL, for many years manager and chief representative of the aircraft department of Cellon, Ltd., and who rejoined the R.A.F. on the outbreak of war, has resigned his commission and resumed his position with Cellon, Ltd.

To Plan for Peace

SIR CHARLES BRUCE-GARDNER, for five years chairman of the Society of British Aircraft Constructors and the holder of several official appointments since 1938 connected with aviation planning and supply, has been appointed Chief Executive for Industrial Reconversion at the Board of Trade.

Eire's Free Airport

THE Shannon Airport at Foynes is to become a free port for air transport—the first in the world—as soon as wartime restrictions on traffic can be relaxed.

Legislation to give effect to this decision, which should have an important effect on post-war Transatlantic air traffic, is to be introduced in the Dail (Parliament) in Dublin.

This will mean that in-transit passengers, baggage and merchandise will travel into and out of the airport without formalities of customs and immigration examinations.

Raspberry from Tomato-growers

A CROWDED meeting, attended chiefly by market gardeners in the tomato-growing district of Marton Moss, on the outskirts of Blackpool, was held the other day to protest against the proposed Blackpool airport scheme which would engulf a number of them.

Lytham St. Annes, Fylde Rural District Council, Southport Town Council, and the Lancashire County Council are all opposed to the scheme (described and illustrated in *Flight*, September 21st) which has been estimated to cost no less than £30,000,000.

U.S. Honour for King's Physician

AIR MARSHAL SIR HAROLD E. WHITTINGHAM, Director-General of Medical Services of the R.A.F., and Honorary Physician to the King since 1938, has been given the John Jeffries Award for 1944 by the U.S. Institute of the Aeronautical Sciences in recognition of his contributions to aeromedical research.

Sir Harold, who in 1934 initiated and organised all medical research of the R.A.F., and whose research work covers almost the entire aeromedical field, is to be presented with the award at the institute's "Honours Night" dinner next January.

To Dominate the Enemy

THE new Consolidated Vultee bomber, the B-32, which is in the same class as the B-29 Superfortress, has been named the "Dominator." It is being produced at two of the company's factories, but all information on production and performance is still witheld by the U.S. War Department.

Cargo Version of B-29

BOEINGS are reported to be building a double-decked transport version of the B-29 Superfortress which, it is expected, will be ready to fly within a few months.

The chief modification from the B-29 is a new and larger fuselage, and the new Boeing is said to have "top commercial possibilities" as a long-range passenger airliner after the war. It will be larger than any transport aircraft now flying, though not as big as the huge passenger airliner now under way at the Consolidated Vultee plant at Fort Worth.

Air Marshal Sir Harold E. Whittingham.

Aviation in South Africa

A REGULAR internal air service is to begin operation in South Africa within a few weeks, it was recently announced by the Union's Minister of Transport, Mr. F. C. Sturrock.

Discussions were taking place with the British Government, he said, with a view to the establishment of a London-South Africa service, via Cairo, in 48 hours.

Home Support for White Paper

THE Joint Air Transport Committee of the Association of British Chambers of Commerce, the Federation of British Industries, and the London Chamber of Commerce (hereinafter referred to as the J.A.T.C.A.B.C.C.F.B.I.L.C.C.!) has expressed its general approval of the Government's proposals set forth in the recent White Paper on international air transport.

In a communication to Lord Swinton, Minister of Civil Aviation, however, it is pointed out (among other things) that the phrase "country of origin" needs to be clearly defined, as it is essential that all aircraft of the British Commonwealth and Empire should be regarded as having one country of origin. It also recommends that any international convention into which the British Empire may enter shall be determinable in five years.

Slight Slip

IN the paragraph announcing the new company recently formed by Westland Aircraft, Ltd., which appeared in our issue of October 19th, the name of the new concern was inadvertently given as Western Engineers, Ltd. This should, of course, have been Westland Engineers, Ltd.

Swedish Complaint

THE Swedish newspaper, *Dagsposten*, is by no means in favour of the reopening of the air service with Britain by their *Aerotransport* concern.

In a recent editorial, the paper accuses the airline's managing director of breaking his promise that the service would not be renewed until he could guarantee the safety of all aircraft flying this route.

Now, the newspaper points out, the service has been renewed with converted

HERE AND THERE

Flying Fortresses which fly at night without lights and therefore cannot be distinguished from ordinary B-17 bombers by German night-fighter pilots.

What makes *Dagsposten* think that no German pilot would knowingly attack a civil machine is not explained!

New Brush Director

MR. F. S. MITMAN, who for many years has been associated with the light alloy industry, and between 1939 and 1942 held responsible posts in M.A.P., has now joined the board of the Brush Electrical Engineering Co.

On leaving M.A.P. in 1942 he became chairman and managing director of Messier Aircraft Equipment, Ltd., and is retaining his connection with this company.

U.S. Forecast

MR. A. B. BOYCE, chairman of the airlines committee for U.S. air policy, said recently that after the war the B.O.A.C. would probaby "pass out of the picture."

He made this observation in answer to a question about competition with foreign monopolies, and asserted that future defence, security and the development of foreign trade could be most effectively achieved under a policy of regulated competition as opposed to the use of a single chosen instrument to fly international air routes.

Yes, They Had Some

THIS week's prize story concerns an airman stationed in the Azores. This young man, a native of Evesham, where fruit is a staple diet, asked a Portuguese youth to fetch him some bananas and, having nothing smaller, handed him a £ note with which to make the purchase.

The lad returned after a while with a cart piled high with the fruit—and no change!

Collaborators ?

THE French newspaper *Humanite* recently reported the arrest of two Frenchmen, not named, charged with manufacturing flying bombs. They are the managing director and the works manager of a Paris factory called *La Precision Mecanique* which employed 650 workers.

"These two traitors," said *Humanite*, "produced automatic pilots for the V1 and the V2.

DC-2½

PAN AMERICAN AIRWAYS has bought 13 of the U.S. Army's C-39 transport aircraft to be operated by their Latin-American subsidiaries. Drastic cuts in passenger fares and freight rates were recently announced by Mr. Juan Trippe, for the P.A.A. Latin-American services.

The C-39 is a combination of DC-2 and DC-3 and is sometimes playfully called the DC-2½. It has DC-2 fuselage and wings, with DC-3 centre-section, landing-gear, brakes and hydraulic system.

According to *American Aviation*, its wing-loading is low and it can easily operate from comparatively small fields. Pan-American is said to be paying about $35,000 (roughly £8,700) for each of these useful hybrids, with an allowance for conversion.

FIGHTING CHIEF : Air Marshal Sir Roderick Hill, A.O.C.-in-C. of the "revived" Fighter Command, snapped recently in his Operations Room, with two of his staff—Sqn. Ldr. R. S. Ingram (left) and Group Capt. G. E. Sampson.

The 10,000 B-17

THE Boeing plant at Seattle recently announced the completion of the 10,000th Flying Fortress, and on the same day the 10,001st aircraft came off the assembly lines at the Lockheed factory at Las Vegas.

Incidentally, Brig. Gen. Kenneth B. Wolfe, head of the Engineering and Production Division of the U.S. Air Technical Service Command, has stated that the cost of a Superfortress (B-29) has been reduced from an original figure of approximately £849,099 to about £150,000.

To Fight the Japs

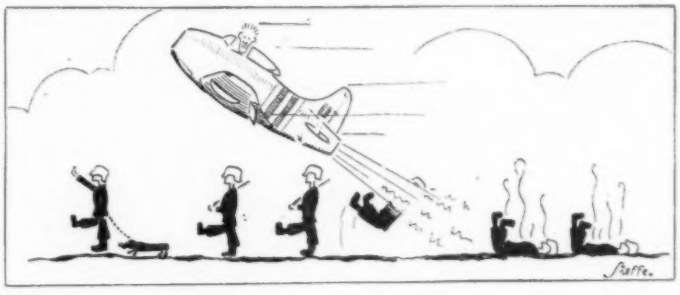
A LIMITED number of South African Air Force squadrons, it is reported, will remain in the Mediterranean area after the European war to protect Allied lines of communication. Other units will fly to the Far East to take part in operations against the Japanese.

Air Marshal Sir John Slessor, Deputy Air Commander-in-Chief in the Mediterranean, has taken part in discussions at Pretoria with the South African Defence Department on the future of the South African Air Force.

Grandpapa on "Ops"

P/O. E. H. PARTRIDGE, a Toronto aircrew member of the R.C.A.F. Bison Squadron, has the distinction of being the only grandfather flying on regular "ops"—at least there are no other claimants to date as far as we know.

Before Goebbels gets hold of this to try to cheer up the *Luftwaffe* with a story of our man-power shortage, perhaps we ought to explain that P/O. Partridge was married when he was 16 and that his 17-year-old daughter has just presented her young hubby with a baby daughter. "Grandpapa," in fact, is only 34 years of age!



Ensuring Future Safety

GEN. SIR FREDERICK PILE, A.A. Command Chief, said at Chiswick recently that he believed the flying bomb was a weapon which had come to stay. It could be easily assembled and did not need large factories for its production.

When the time came to disarm Germany they must be sure that she was denied further opportunities of producing it.

Every new weapon had its antidote, and after the war the public must insist that Britain had ample research establishments for dealing with any type of new weapon. That way alone spelt safety in the future.

R.P. Beaufighters standing ready armed on the airfield.

R.P. Squadron

Impressions from a Flight in a Beaufighter Employing Our Newest Weapons

By JOHN YOXALL

IN the whole of nine years' experience of war—some of it very close to the spots where things happen—I have never heard or seen anything so truly terrifying as a rocket projectile attack. First the target is smothered with a blanket of 20 mm. cannon shells and then the salvos of rockets go in, filling the air with an overpowering noise like condensed thunder. Except to say that the noise is soul-gripping in its intensity, it is difficult to describe. There is not the high-pitched shriek of a screaming bomb; no swish like that of a firework rocket. The nearest I can suggest is purely imaginary.

Supersonic Reverberations

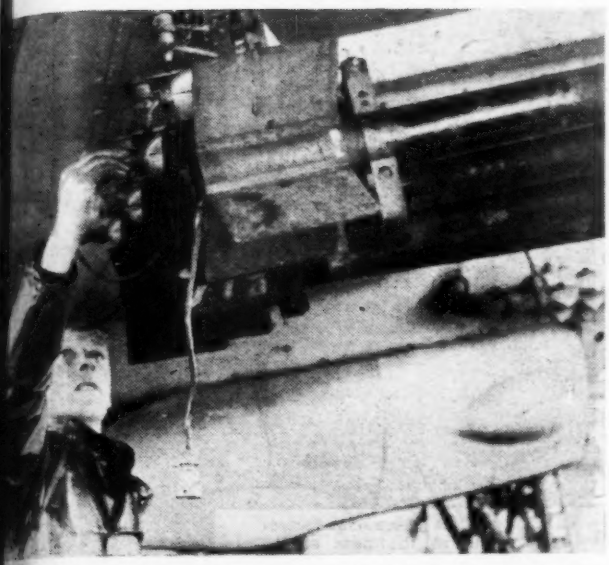
Think of the noise made by eight super-express trains, in line abreast, driven "flat out" by demon drivers. Then imagine a sudden and complete silence which, by comparison, is as awe-inspiring as the noise. In this you have a slight impression of a salvo of rocket projectiles fired from one aircraft. Multiply this by perhaps twenty or even thirty—within two or three minutes—and you have an idea of what an attack on a convoy must sound like to the men on the ships. Small wonder that the aircrews report seeing men jump overboard as they come in to attack.

In the aircraft the cannon, of course, can be heard above the noise of the engines, but only a small whip-like crack signifies the release of the rockets. This is presumably caused when the cordite gases blow out the end plugs.

There are several lb. of cordite used as a propellant, and this is contained in the 3¼in. diameter tail tube. When the trigger is pressed, an electric current fuses a platinum wire which, in turn, finally starts the cordite burning. The burning cordite gases increase their velocity still further and, as they escape into the atmosphere, they act as a simple reaction motor.

As a weapon the rocket projectile is about the most trouble-free device ever made. No pilot to whom I have spoken has ever had a rocket hang up or misfire. The only trouble experienced is the heads working loose on

Fitting rocket projectiles, with armour piercing heads, into the starboard rails of a Beaufighter.



Screwing the electric fuse connectors into their sockets on the fin end of the projectiles.

their threads and falling off on a long trip to a target. The general vibration of the aircraft is the cause of this, but it is a very rare trouble and easily overcome by a little shellac varnish on the threads when assembling the missiles.

There are no R.P. aircraft on which one can go on an operation. Over land, for close support of the army, where the R.P. is doing really wonderful work, only single-seater machines are being used. Coastal Command use Beaufighters but, as they quite rightly say, who is going to swop a good navigator for a war correspondent?

A Typical Operation

To overcome this handicap I have flown in a Beaufighter making live ammunition attacks on the old U.S. destroyer *Sherwood*. To supplement this I listened to a detailed account of a typical attack as told by Wing Cdr. D. G. Hall, who commands an R.P. Beaufighter squadron, and who takes his turn with other squadron commanders in leading attacks on convoys.

The first move is reconnaissance. It has been said by good authority that despite the weapons an air force may possess, the side which has the best reconnaissance will win. Certainly our reconnaissance is good, and equally certainly we are winning. Recce. for enemy convoys may be the work of specialists at the game, or it may be from a single aircraft laid on by the squadron.

The instructions as to when, where and in what force the attack shall be made, however, come from Group H.Q. Fighter cover is also organised by group. The mode of

BOWLING THEM OUT: Y for Yorker sends a salvo of rocket projectiles streaking towards the target. The R.P. rails are set at such an angle that good shooting like this should give both above and below water hits. This photograph was taken with the camera held close by the pilot's head and shows how little optical distortion there is when looking through the thick bullet-proof windscreen.

R.P. SQUADRON

attack and the weapons carried will vary according to the make-up of the convoy. If there are some big, deep-draft ships, the R.P. Beaus. will be employed in an anti-*flak* role while the main strike is carried out by Torpedo Beaus.

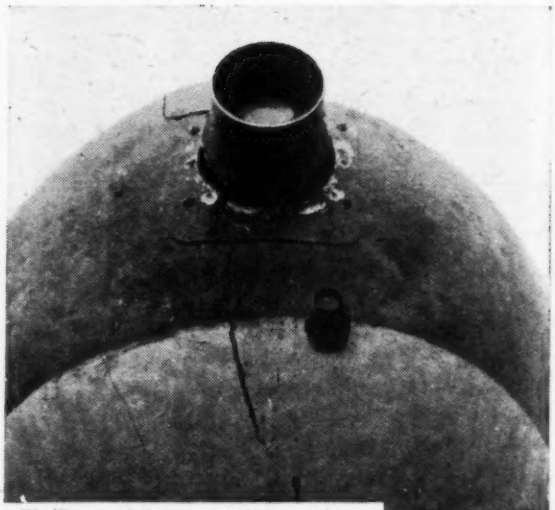
Use as Main Weapon

On the other hand, if the convoy is mostly of shallow-draft bottoms, and there is, therefore, likely to be trouble with torpedoes passing underneath the ships without exploding, then the Torpedo Beaus. leave their tin fishes at home and do the anti-*flak* work by smothering the ships with a blanket of 20 mm. shells from the four cannon which each of them carries. The rocket projectiles in this event become the main weapon. No exact ratio of anti-*flak* to strike force is adhered to, but two-to-one is a very rough average.

At the aircrew briefing the chief features are, of course, the expected position, course, speed, disposition and make-up of the convoy. Proportions of anti-*flak* to strike forces are also detailed. I.C. (in cockpit); S.U. (start up); T.O. (take-off); and S.C. (set course) times are posted up. The leader of the attack then gives his final briefing as to what formations will be flown and methods of attack.

A typical operation might follow this pattern but, of course, there is no stereotyped course of action employed. Let us suppose the convoy is in the area of the south-eastern Frisian Islands. The force might fly straight to the Heligoland Bight and then turn south with the anti-*flak* forces in the van and the strike forces following closely behind. When the convoy is finally sighted, there will be a quick turn to port to attack on the convoy's beam. In this event the whole force, both anti-*flak* and strike, might take up echelon formation during the journey to the target. Then, when the time comes to turn to port, the outside aircraft are half-way round the turn compared with where they would be if a straight Wing-Vic had been flown. For the actual attack, according to whether the force is expected to come under shore as well as ship A.A., the crews might be detailed in the following manner: Approach at 2,000ft. and make a 10-degree dive on target. Open up with cannon at 1,000 yards distance and when down to 600ft. and 600 yards fire R.P. in complete salvo. Reform and set course for base.

At the appropriate time the Beaus. begin to marshall on the runway. The leader parks his aircraft as far up the runway as will just leave him ample room for take-off.



The F.24 and the 35mm. cine recording cameras in the nose of the Beaufighter. A 16mm. combat camera is carried in the port wing.

(Left) Squadron commander and pilot of Y for Yorker, Wing Cdr. D. G. Hall, and (right) his navigator, F/O G. W. Calder.

R.P. SQUADRON

Behind him the remainder crowd-in as close as possible. Flying control gives the signal and the take-off begins. In the leader's Beau. X the throttles are opened up to the stops until the Hercules are doing 2,900 r.p.m. with plus 10 lb. boost. After a run of some 15 seconds the wheels are clear; and the undercarriage is already tucked up as the airfield boundary is crossed. As each man becomes airborne, he turns slightly left or right to keep the runway clear of his slipstream for the next man to take off. Each pilot opens his throttles the moment the man in front leaves the ground.

The leader climbs to 2,000ft. and his navigator continuously flashes a coloured light until his squadron has formed-up in Squadron Vic. Time to set course has not yet arrived, although the fighter cover is already circling overhead, so the formation flies on a reciprocal bearing for half the period, to while away the time.

On course and immediately out over the sea. They look fine. A formation of possibly 60 or more Beaufighter Xs with, perhaps, an equal number of long-range Mustangs as fighter escort. This escort must be maintained, and a certain amount of under cover may also be given, despite the fact that many of the pilots have seen nothing of the *Luftwaffe* for many months.

For the run across the North Sea, the engines will be throttled back to 1,950 revs. with plus 1 lb. showing on the boost gauge. This gives a cruising speed in the region of 180 knots. Wireless silence is preserved, but a number of the aircraft keep a listening-out watch in case a change of plan or an alternative target has been decided upon by Group H.Q.

On they go, mile after mile, over a deserted sea which is just far enough away below them for the waves to appear to have lost all apparent motion. In Y for Yorker the leader looks out on either side to watch the great Bristol Hercules turn the red-nosed de Havilland hydromatic constant-speed airscrews.

At last the convoy is sighted. Over the R.T. the leader orders "Deploy for action," and each three aircraft in a Vic open out a little. The little flaps which cover the cannon and R.P. triggers are turned over to show "Fire," and this automatically switches on the cameras which are carried in the nose and wing. From now onwards the cameras will "take" every time the firing buttons are pressed. *Flak* of all sorts fills the area, for these convoys with their escort ships are very hot targets. "Attack, attack, attack," comes the voice of the leader, and the air is filled with diving Beaufighters. The big hands of the sensitive altimeters swing back in an anti-clockwise direction as height is rapidly lost. The airspeed indicators show over 300 m.p.h.

Ships disappear in the smoke of bursting explosive. A great plume of water goes up as an unfortunate Beaufighter is shot down and hits the water. Thousands of small spurts of water show where 20 mm. shells are hitting. As these spurts reach the ships, they change into brilliant white flashes, and this is the exact moment when the R.P.s are fired. Down they go in their hundreds. Bedlam let loose. Some are bad shots, some are near misses. The majority, however, are either above- or under-water strikes. Fires break out on the ships and some of them slow down and stop in their tracks. The attack ends as suddenly as it began. Three minutes has seen the whole affair over. Squadrons reform and journey homeward.

Back at base patient interrogation officers piece little bits of information together to give Group a picture of the attack. Photographs taken during the show are developed and printed, and these provide unquestionable evidence of hits and misses.

Later, reconnaissance aircraft will report more fully as to how many ships were sunk, how many beached and how many damaged. Another strike is ended.

Celebrating a Flight

On Saltburn Sands, Yorkshire, by Robert Blackburn, 35 Years Ago

THIS week we desire to apologise to our readers for a sin of omission which we committed thirty-five years ago. There were extenuating circumstances; still, we failed to record in our pages the first flight made by Mr. Robert Blackburn, now chairman of Blackburn Aircraft, Ltd Our excuse must be that we were never told of it. We can only suppose that the modesty where his personal achievements are concerned which characterises Robert Blackburn to-day was a trait in his character even then. He probably thought that the flight was "nowt." In very truth, it probably would be regarded as rather less than "nowt" in 1944, for it was little more than a jump into the air and a minor crash. That was how all the pioneers flew in those days. A jump, a crash, a return to the shed for repairs probably taking several weeks, and then another jump, most likely with similar results. But they were enthusiasts. They had to be; there was no encouragement and they were mostly looked upon as more or less harmless lunatics whom it were better to humour. Their enthusiasm and faith carried them over all disappointments and failures, and ultimately they won through to success, often bitterly fought for.

Robert Blackburn was of that small band to whom the country owes so much to-day. Trained as an engineer, he was a frequent visitor to France, where the Wright brothers, the Farman brothers, Blériot, R. E. Pelterie and others were laying the foundations for the conquest of the air. In Paris, in 1908, young Robert Blackburn designed his first flying machine and built it in Leeds the next year. In October, 1909, he made his nrst flight on it (on Saltburn Sands in his native Yorkshire) and crashed it, which is scarcely surprising if one examines the picture on page 462 of this issue. But "Bob" did not give up. By 1911 he had a monoplane which flew very well, piloted by Mr. B. C. Hucks. Since that time the Blackburn brothers (Bob was joined by Norman and Charles) have never ceased to contribute to the growth of British aviation. Particularly has the name been closely linked with aircraft for the Navy.

On October 26th members of the British flying world paid a sincere tribute to Robert Blackburn and his pioneer work at a gathering in London. There were no toasts and no speeches (again, one supposes, at the request of modest Bob), but Sir Frederick Handley Page spoke a few words of appreciation, to which Mr. Blackburn merely replied by saying how pleased he was to see so many old friends.

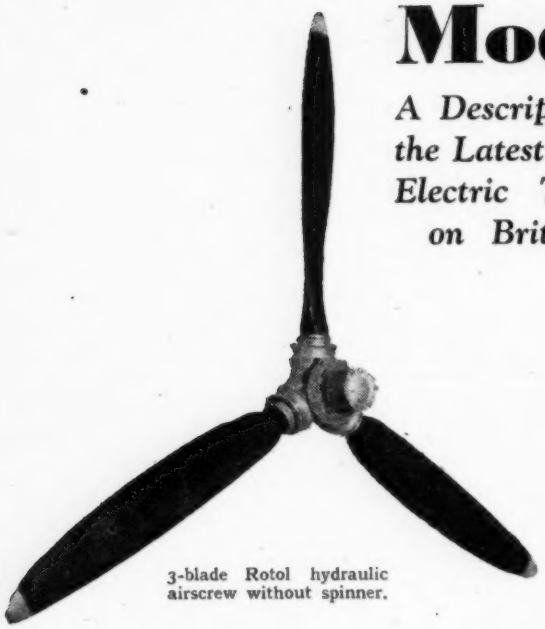
Sir Frederick recalled that he had known Bob Blackburn since the earliest days. In fact, it could be said that Bob had enabled the Handley Page concern to pay its weekly wages on an occasion when this might otherwise have been difficult. Mr. Blackburn ordered his undercarriage from Handley Page. "Then," said Sir Frederick, "we anticipated the wishes of the present Ministry of Aircraft Production by farming out the order to sub-contractors, thus inaugurating the dispersal scheme."

That would not, of itself, have enabled them to pay the week's wages, but they did a thing of which, Sir Frederick said, "Mr. Pickles would not approve had he been there. We made a profit out of the sub-contractors." Mr. Pickles was for very many years head of the Contracts Department of the Air Ministry and now of the M.A.P.

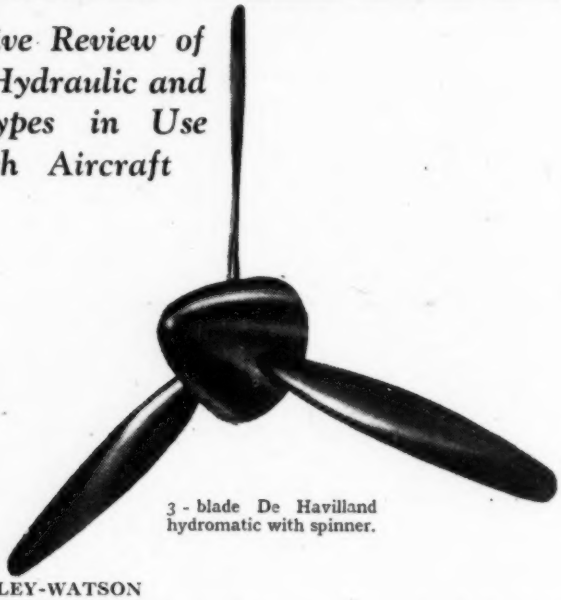
Among those present were many prominent in all branches of British aviation, including the R.A.F., the Navy, the industry, research, Parliament, and many other sections of British life. A few eminent people were prevented from being present, either by important engagements on national work or through absence abroad

Modern Airscrews

A Descriptive Review of the Latest Hydraulic and Electric Types in Use on British Aircraft



3-blade Rotol hydraulic airscrew without spinner.



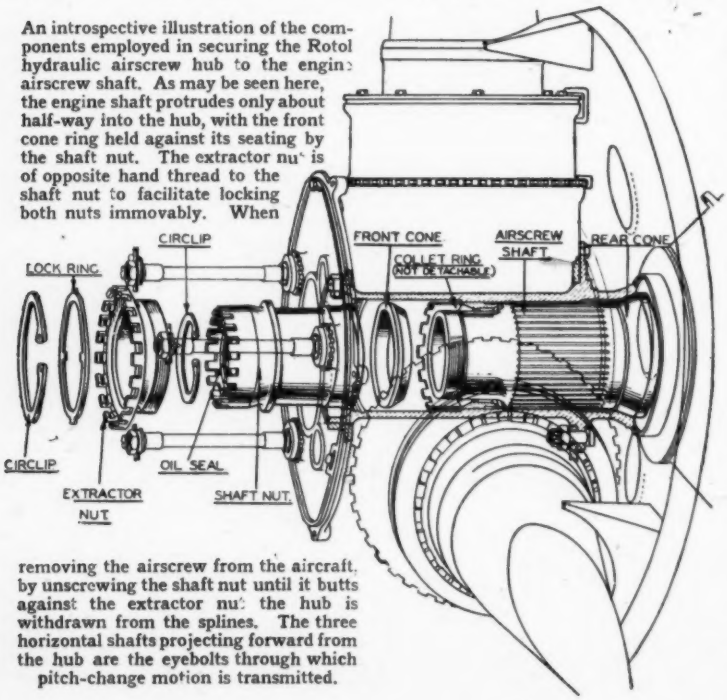
3-blade De Havilland hydromatic with spinner.

By C. B. BAILEY-WATSON

USERS of aircraft have ever demanded better performance—quite rightly, of course, for the highest performer heads the field—and designers both of aircraft and of aircraft engines have continually been pressed to greater efforts in an attempt to meet the demands. As those responsible for the engine side of flying developed new types of power units and, in addition, were able to squeeze more power from existing types, so the performance of aircraft was steadily enhanced. The general cleaning-up of aircraft aerodynamically also brought a great measure of progress, but these contributions could not, by themselves, have brought the aircraft to the position of efficiency it now occupies. The airscrew has had a most important part to play and, for that matter, still has. Necessity for a variable pitch airscrew is apparent when it is realised that no single blade pitch can give optimum efficiency under all conditions of flight.

Prior to the inception of airscrews on which the blade pitch was adjustable, i.e., variable-pitch types, the airscrews in existence were of necessity designed to be an effective compromise of the pitch angles required for various flight conditions. Thus small, light and high-speed aircraft were fitted with airscrews the blade pitch of which gave economical cruising or high-altitude performance, but necessarily poor take-off qualities. Conversely, the heavy types of aircraft, which required good take-off characteristics, had to be provided with a blade pitch which gave the requisite take-off, but consonantly made high speed and good cruising performance impossible.

It was not until the supercharged aircraft engine became established in use that any real move was made to alter the limitations of fixed-pitch airscrews, and this came about only because the maximum speed potential at high altitudes was crippled by the requirements of take-off, and no really effective compromise could be made between the two.



An introspective illustration of the components employed in securing the Rotol hydraulic airscrew hub to the engine airscrew shaft. As may be seen here, the engine shaft protrudes only about half-way into the hub, with the front cone ring held against its seating by the shaft nut. The extractor nut is of opposite hand thread to the shaft nut to facilitate locking both nuts immovably. When removing the airscrew from the aircraft, by unscrewing the shaft nut until it butts against the extractor nut the hub is withdrawn from the splines. The three horizontal shafts projecting forward from the hub are the eyebolts through which pitch-change motion is transmitted.

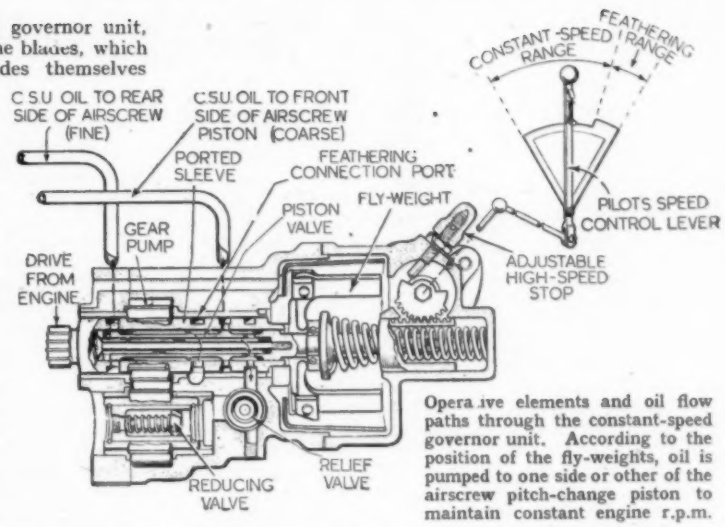
High Performance Standard

The present-day airscrew, whether of the hydraulic or electrically actuated type, is a wonderful piece of precision engineering, and the complex loads and vibratory stresses it has to withstand in the performance of its work, and indeed the work itself, call for great skill in design, first-class materials and workmanship of a very high standard.

Constant-speed, controllable-pitch airscrews are to the aircraft engine very much what the gear box and road wheels are to the car engine, for these airscrews.

through the medium of a constant-speed governor unit, automatically regulate the pitch angle of the blades, which is, in effect, the gear ratio; and the blades themselves provide area for the transmission of thrust as does the contact area of car tyres. The constant-speed mechanism of the airscrew, however, goes somewhat farther than the car gear box, in that it maintains the engine speed constant at a figure selected by the pilot, irrespective, within limits, of the load and likewise of the boost pressure.

This is performed by varying the pitch angle of the blades in order to maintain the most effective balance between power output and the load on the engine. For example, when the aircraft is in steady, level flight the engine r.p.m. may be 1,800, boost+5 lb./sq. in., and the pitch angle of the blades 40 deg. Now, should the pilot start climbing, the load on the engine is increased and the r.p.m. tend consequently to fall; although the boost value does not change, immediately this happens, the constant-speed unit regulates the blade pitch to a finer angle, say, 30 deg., allowing the engine to speed up to its original figure of 1,800 r.p.m



Operative elements and oil flow paths through the constant-speed governor unit. According to the position of the fly-weights, oil is pumped to one side or other of the airscrew pitch-change piston to maintain constant engine r.p.m.

Advantages of Constant-speed

Conversely, should the pilot start diving, the load on the engine is relieved, the "revs" tend to soar and the blade pitch is automatically coarsened until the r.p.m. are brought back to their selected figure. Thus, the r.p.m. and the boost pressure having remained the same throughout, the actual power output of the engine is maintained at a determined value, irrespective of the attitude of the machine, although naturally the speed of flight is dependent upon attitude. For instance, when climbing, the engine would be turning over at the same speed for the same boost, thus producing the same power as when in level flight, but, due to the finer blade pitch which permits this condition, the aircraft will not be pulled through the air for so great a distance per revolution of the airscrew.

Employment of constant-speed, controllable-pitch airscrews brings a great many advantages, some of the chief of which are the ability to ensure that the engine performance is an optimum whatever the obtaining conditions or desired goal. That is to say, by employing an airscrew of this type the engine is able to operate under the most favourable conditions no matter whether good take-off, quick climb, high speed, economical cruising, high-altitude performance, or a compromise of all these qualities, is required. Furthermore, the purely tactical advantage of manœuvrability is enhanced, since the pilot can concentrate on the attitude of his aircraft, the engine and constant-speed unit working in unison to do their part without requiring his attention, unless, of course, he wants a sudden burst of power or complete power cut-off.

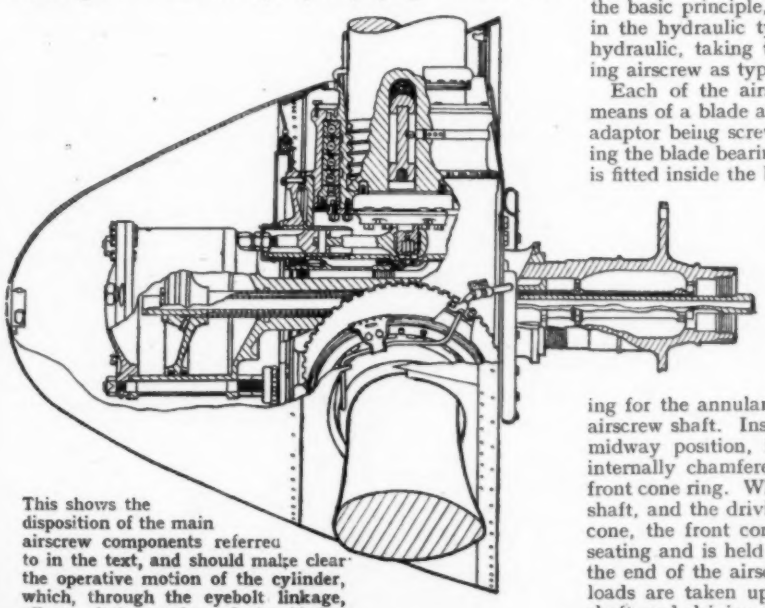
Constant-speed airscrews are made in this country both by the airscrew division of the de Havilland Aircraft Co., Ltd., who manufacture under licence the Hydromatic airscrew of the American Hamilton Standard Propellor Co., and by Rotol, Ltd., a company of Rolls-Royce and Bristol parentage. Rotol produce a hydraulic airscrew of their own design as well as making an electric airscrew based on the design of the Curtiss Electric Propeller.

Rotol Hydraulic Airscrew

All constant-speed airscrews, whether British or American, employ either hydraulic or electric pitch-change mechanisms, but there are different methods of utilising the basic principle, and this is shown up more particularly in the hydraulic types. First we will consider the Rotol hydraulic, taking the 65 deg.-range, three-bladed feathering airscrew as typical.

Each of the airscrew blades is secured in the hub by means of a blade adaptor and a bearing housing, the blade adaptor being screwed on the root of the blade and carrying the blade bearing stack of four ball races. This assembly is fitted inside the bearing housing which, in turn, is externally threaded to screw into the barrel of the hub proper. An internally splined member, called the hub driving-centre, is threaded and bolted through the hub on its axis of rotation, and it is into the splined bore of the driving centre that the engine airscrew shaft is fitted.

An internal chamfer on the rear end of the driving centre provides a seating for the annular cone which is fitted at the base of the airscrew shaft. Inside the hub driving centre, at about the midway position, is a collet ring which incorporates an internally chamfered surface to provide a seating for the front cone ring. When the hub is assembled on the airscrew shaft, and the driving centre is properly seated on the rear cone, the front cone ring is placed in position against its seating and is held there by the shaft nut which screws on the end of the airscrew shaft. Thus, the static and thrust loads are taken upon the two cones, and the splining of shaft and driving centre merely transmits torque.



This shows the disposition of the main airscrew components referred to in the text, and should make clear the operative motion of the cylinder, which, through the eyebolt linkage, effects pitch rotation of the blades.

MODERN AIRSCREWS

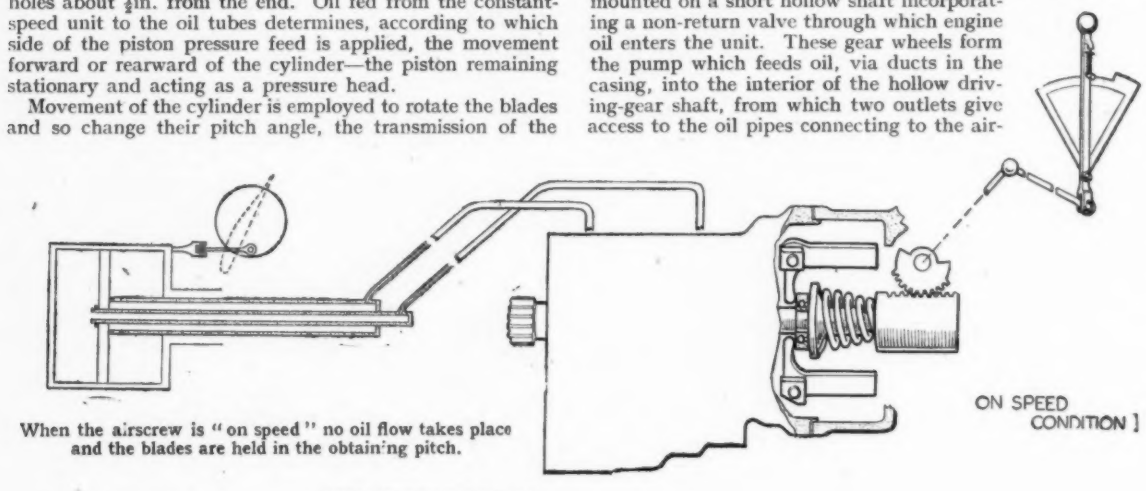
The airscrew shaft is hollow and houses the cylinder stem, which is free to slide in and out. This member is a thick-walled tube, the forward end of which is fashioned as a shallow, large-diameter cylinder. Inside the cylinder stem are fitted two oil-tubes, nested co-axially, to allow the passage of oil through the bore of the inner tube and also through the cylindrical space between the inside tube and the bore of the outer tube. The inner tube screws into position, whilst the other tube has a spline engagement. On the forward end of the inner tube (which projects beyond its outer fellow) is fitted the piston, the boss of which butts against the end of the outer oil tube—thus holding it in position—and the piston is locked by means of a retaining ring-nut screwed on the end of the inner tube. The piston carries on its periphery two back-to-back, cup-type, synthetic-rubber oil seals which bear against the cylinder bore.

The inner oil tube conveys oil to the front side of the piston, and the outer tube carries oil to the rear of the piston, the oil emerging from the outer tube via radial holes about ½in. from the end. Oil fed from the constant-speed unit to the oil tubes determines, according to which side of the piston pressure feed is applied, the movement forward or rearward of the cylinder—the piston remaining stationary and acting as a pressure head.

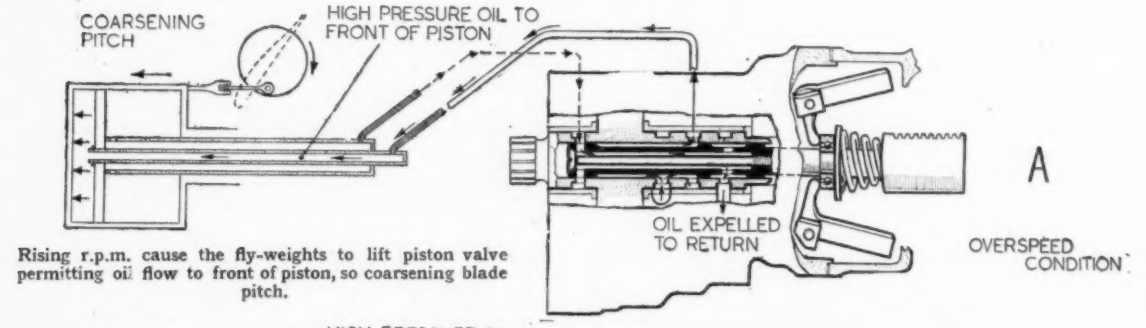
Movement of the cylinder is employed to rotate the blades and so change their pitch angle, the transmission of the linear motion of the cylinder to the rotary motion of the blade roots being achieved by means of articulated linkages. Each linkage comprises an eyebolt secured to the cylinder and terminating in a fork-end in which, by means of a gudgeon pin, an operating link is pivoted. This pivot connection is retained in a Tufnol sleeve, and may be likened to the "little-end" bearing of a car engine. The opposite end of the operating link terminates in a boss bored to accept a needle-roller bearing in which is fitted the operating pin on the blade root.

It may thus be seen how oil pressure fed to one side or other of the piston causes the cylinder to move and thus rotate the blades in order to change their pitch. However, the determination of pitch change is the province of the constant-speed governor unit, usually referred to as the c.s.u.

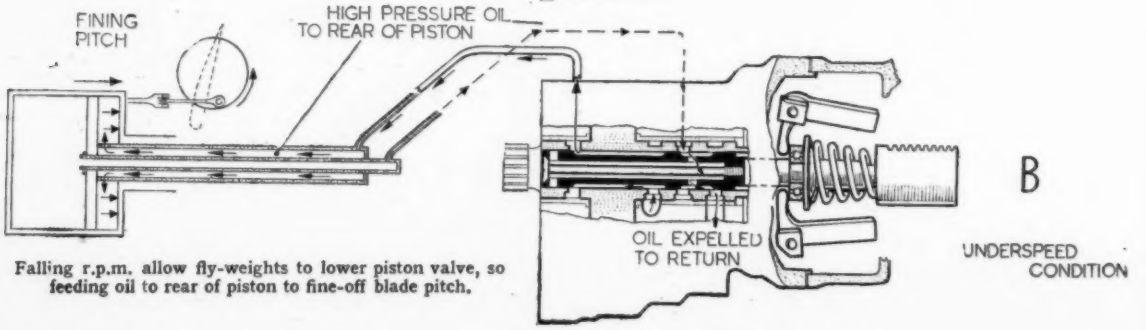
The unit is composed of three main elements, a gear-type oil pump, a centrifugal governor and a piston valve, all of which are housed in a three-part casing. The gear-type pump is also the drive for the centrifugal governor and comprises a driving gear mounted on a long hollow shaft, one end of which is splined to transmit the drive from the engine. Meshing with the driving gear is an idler gear mounted on a short hollow shaft incorporating a non-return valve through which engine oil enters the unit. These gear wheels form the pump which feeds oil, via ducts in the casing, into the interior of the hollow driving-gear shaft, from which two outlets give access to the oil pipes connecting to the air-



When the airscrew is "on speed" no oil flow takes place and the blades are held in the obtaining pitch.



Rising r.p.m. cause the fly-weights to lift piston valve permitting oil flow to front of piston, so coarsening blade pitch.



Falling r.p.m. allow fly-weights to lower piston valve, so feeding oil to rear of piston to fine-off blade pitch.

MODERN AIRSCREWS

screw oil tubes. Inside the hollow gear shaft is the piston valve which has lands upon it and is moved by the centrifugal governor, so determining to which oil tube the high-pressure oil shall be fed. When the piston valve is in a central position both outlets are blanked-off by the lands, and the high-pressure oil from the pump is by-passed back through a relief valve to the suction side of the pump.

Speed Control

The centrifugal governor consists of two L-shaped fly-weights, the lower arms of which bear against the outer race of a ball bearing mounted on the end of the piston valve. On the other side of the ball bearing is a flange against which bears a coil spring to compensate the centrifugal movement of the fly-weights. Above the spring is a sleeve along which are cut racking teeth to mesh with a toothed segment controlled from the pilot's cockpit. Thus, according to the position to which the segment is turned, the tension of the coil spring is either lessened or increased in order to balance the centrifugal moment of the fly-weights and so determine the position of the piston valve and the consequent distribution of the oil to the airscrew oil tubes. Inside the racked sleeve a further coil spring is housed, the object of this being to ensure that the sleeve is kept in the position for normal cruising r.p.m. should the control from the cockpit be shot away or become disconnected.

It will now be appreciated that the speed at which the engine runs is governed purely by the pitch of the airscrew blades, and that the pilot's throttle lever affects only the manifold boost pressure—it does not affect the engine r.p.m. But for the control which *does* affect the r.p.m. of the engine there is *ipso facto* an excellent case for dropping the usual title of "pitch control lever" in favour of "speed" or "r.p.m. control." The pilot, of course, does not control the airscrew blade pitch—he is uninterested in the pitch—all he is concerned with is controlling the engine speed, and it is felt that much less all-round confusion would be caused if the erroneous "pitch control lever" were dropped and with it the false impression the title conveys.

Feathering

So far, no mention has been made of the feathering side of airscrew operations. When an engine failure occurs, the reason for feathering the airscrew blades, i.e., turning them so that they are virtually "edge-on" to the line of flight, is that with the blades in such a position the very least possible air flow resistance is offered, and furthermore there is no tendency for the airscrew to "windmill," and thus possibly increase the damage to the engine.

The range of engine speed governed by the c.s.u. is represented by the degree of travel of the pilot's speed control lever. This is fitted in a quadrant the rear of which has a gate through which the control lever may be passed by lifting a stop catch. When it is desired to feather, the catch must be lifted and the lever moved rearward through the gate. This final travel actuates the racked sleeve in the c.s.u. and moves the piston valve to the positive coarse pitch position.

However, due to the fact that the c.s.u. is engine driven it would be useless to rely on the c.s.u. pump for delivery of feathering oil, and for this reason a separate electrically driven, high-output pump is provided for the purpose.

This feathering pump is brought into action by the pilot depressing a special feathering switch in the cockpit, whereupon the pump immediately feeds oil to the c.s.u. whence it is directed to the coarse-pitch side of the piston in the pitch-changing mechanism of the airscrew, and so rapidly rotates the blade to the feathered position. The feathering operation takes approximately eight seconds.

(To be continued.)

"Sons of the Air"

Well-produced Film About the A.T.C. : Impressive London Première

IT takes quite a long time to make a film, even a documentary, so it may reasonably be assumed that when it was decided to make "Sons of the Air," which tells the story of the Air Training Corps, neither Mr. Castleton Knight, the producer, nor Flt. Lt. Edward Jarratt, who supervised for the A.T.C., had any suspicion that by the time their finished product reached the public screen, the Government would have decided to whisk a very large proportion of A.T.C. cadets into the Army instead of the R.A.F.

This is no place to discuss the inevitable disappointment—not to say discouragement—of thousands of A.T.C. cadets and potential cadets caused by what we must accept as a necessary decision, but it does mean that the general "recruiting campaign" tone of the film struck me as a trifle incongruous as I watched its first public presentation at the Tivoli last week—just two hours after *Flight* had gone to press with last week's issue!

Not that this film was designed primarily to stimulate A.T.C. recruiting. Produced with the full co-operation of the R.A.F. and the Air Ministry, it is expressly stated that it has been presented to the A.T.C. by Mr. J. Arthur Rank, head of Gaumont-British, as a personal tribute to the good work of the Corps' officers, instructors and cadets. So possibly the suggestion of a recruiting atmosphere must be credited very largely to the familiar news-reel voice of E. V. H. Emmett, whose commentary probably made many a greying head wish he were back in his teens. It did me!—despite the optical distortion inflicted by a side seat.

Possibly the best thing about "Sons of the Air" is that no attempt has been made to indulge in any of those professional tricks—clever camera angles, etc.—which are out of place in a documentary film of this kind. It has been directed with a straightforward simplicity which gives it strength and dignity. Moreover, its characters are real people, doing what they normally do, and very likely not one of them had ever found himself in front of a movie camera in his life before.

The film takes one through the training of the A.T.C. cadet from the moment he joins until he is ready to pass out into the R.A.F. (and but for the present exigencies of the war, would normally do so), and if I have any criticism to offer it is that the sequences included one showing cadets receiving airscrew instruction in a "classroom" bomber which might be described as a cousin, slightly removed, to the Link. Now this is all very nice and interesting, but it is *not* part of the standard A.T.C. course. By no means every A.T.C. squadron is fortunate enough to possess such equipment, yet the way in which this scene was dovetailed in implied that it was "all part of the A.T.C. service"—to coin a phrase. I felt that it should have been made quite clear that this was the sort of "extra" to the normal course of training that *some* of the more fortunately placed squadrons are able to offer their cadets.

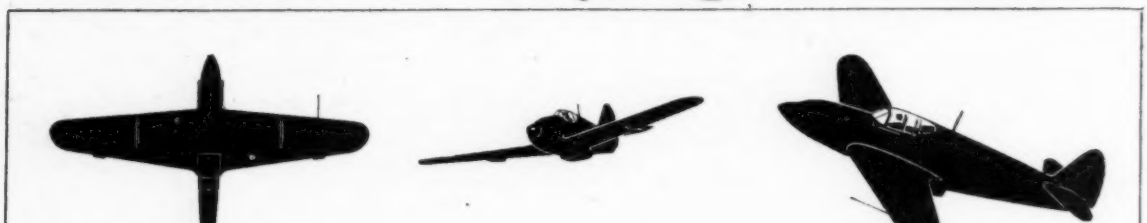
The film ends with a special parade on Wellington Barracks parade ground at which Air Marshal Sir Leslie Gossage, Director-General and Chief Commandant of the A.T.C., reads the citation of the V.C posthumously awarded to Flt. Sgt. A. L. Aaron, the first ex-A.T.C. cadet to win it. The march past, at which Sir Leslie and the V.C.'s father take the salute, makes a moving and impressive finale.

The occasion of the film's premiere was also impressive, from the seried ranks of gold-braided R.A.F. caps parked in the foyer, to the single rank of smart A.T.C. buglers whose clarion notes heralded the film from the decorated orchestra pit. Afterwards, Capt. H. H. Balfour, Under-Secretary for Air, paid a tribute to the A.T.C. and said that they looked forward to seeing the A.T.C. playing a vital rôle in peacetime in supplying recruits of the finest quality for both military and civil aviation in this country.

N. D. R.

Studies in Recognition

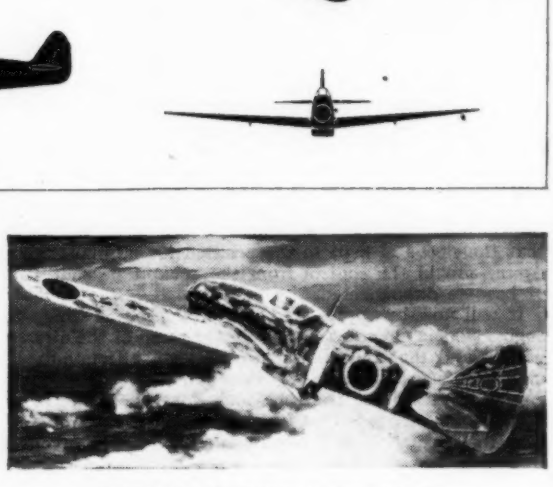
Aircraft in Flying Attitudes



"TONY" (One Jap-built Mercedes-Benz)

BUILT by Kawasaki, one of the firms in the Mitsubishi combine, "Tony" is the first Japanese single-seater fighter to be powered by a liquid-cooled, in-line engine; its native designation is Mitsubishi S-03, and it has been allocated to the Japanese Army Air Force. This is in itself a little surprising, because the Japanese Naval Air Service, an integral part of the Navy which, in Japan, has a decided pull with the big industrialists, usually manages to acquire the pick of available aircraft, and, up to the present, there has been no sign of using the same aircraft in both Services.

Japan, of course, had the security business "buttoned up" long before the war. For years they had been warning their people against careless talk by means of posters announcing "Every Foreigner is a Spy," and thus accurate information was almost unobtainable about anything they wanted to keep dark—and there was more of that than we suspected. They went to considerable lengths to deceive the rest of the world about their war preparations, and when they held an aircraft exhibition, several years before the present war, they exhibited the oldest types they dared without exciting undue suspicion while most other nations sent along up-to-date designs, and thus presented the wily "Nips" with quite a lot of useful information gratis.

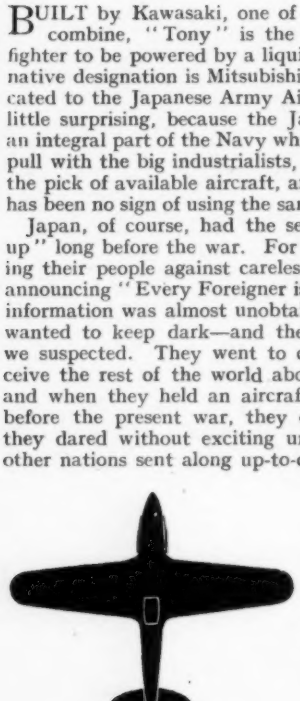


Mitsubishi S-03, "Tony," Army Fighter.

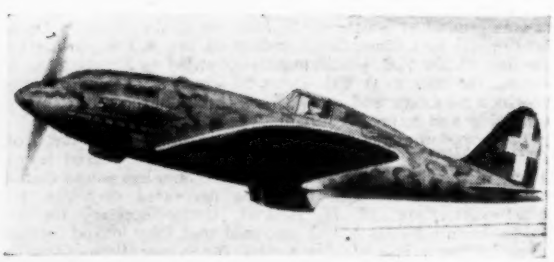
In general, the only precise technical "gen" the Allies have been able to obtain about the latest types of Jap aircraft has come from samples occasionally captured intact, and in a war theatre where there is a lot more sea than land this does not happen too often. But a "Tony" was recently captured in one piece by the U.S. Forces at Cape Gloucester in New Britain and was carted away by the A.A.F. for examination. So far, however, only the most superficial description has been released for publication.

The engine, for example, is a Japanese-built version of the Mercedes-Benz DB type of liquid-cooled, in-line, inverted-V, 12-cylinder engine, but which model and what horse-power is not revealed. Its top speed is given as no more than 330 m.p.h., so it would appear to be one of the earlier types similar to that powering the Me 109E, perhaps. Armament includes two cannon.

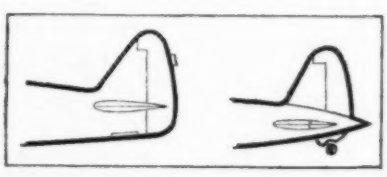
In general lines, the "Tony" resembles the Macchi C.202 and the He 113, the former being illustrated here by way of comparison. "Tony" differs, however, in having wings of appreciably higher aspect-ratio though the uniform taper and round tips are similar. The difference in their respective tailplanes will be observed, and also in their fins and rudders, particularly in respect of the rudder's trailing edge. As regards their respective fuselages, each of which has a 'midships radiator, it will be seen that the Macchi's cockpit is further back, resulting in a sharper taper towards the tail. Dimensions of the "Tony" are: Span 39ft. 4in., length 30ft.



Although the uniform taper and round tips of the Macchi wings are similar to those of "Tony," their aspect-ratio is lower and they are set farther back. Also the tailplane is elliptical.



Macchi C202 Fighter.



"Tony's" rudder (left) extends below the tailplane whereas that of the Macchi sits above the pointed tail of the fuselage.

Standardised Wiring

New British System for All Aircraft Evolved by S.B.A.C.

THE Technical Board of the Society of British Aircraft Constructors is responsible for the evolution of a new system of electrical wiring for aircraft which is in advance of any other system in the world.

Experience has shown that aircraft electrical systems tend to multiply. New equipment requiring additional electric power is, for instance, frequently introduced after the prototype aircraft has been built and test flown. Further, the growing complexity of modern aircraft has necessitated increasing maintenance periods for the various electrical systems which sometimes employ literally miles of wiring, much of it frequently carried at awkward or inaccessible places.

Up till now each type of aircraft required to have its own special wiring system, and these systems, built primarily to satisfy particular and immediate needs, were rigid and not suitable for adaptation to extra requirements. For example, a multi-socket might have 24 plug-in points, and when, as often happened, another two or four points were needed for extra services, then the only means of meeting the need was by fitting another large multi-pin socket, thereby adding unnecessary weight and occupying precious internal space. Again, with multi-core cables the addition of only one circuit necessitated an extra length of, possibly, 10-core cable carrying superfluous weight.

The new standardised system circumvents these troubles. It consists essentially of direct connections from the main power source (generator or accumulator) to a series of connector blocks from each of which extend simplified plug-in leads. The connector blocks are made of a strong, lightweight plastic of high electrical efficiency and, so far, are available in two, three, five and 15-way units either single or double tiered. A two-way unit can thus offer four pick-up points.

With the Standard Wiring System an aircraft designer can provide at one centralised point—or at any number of dispersed points—the requisite number of connector blocks with their varying numbers of leads. Should it be found expedient, in course of time, to increase the number of leads, all that is necessary is to affix an additional block of the requisite capacity. Clusters of blocks can be grouped in a very small overall area, as for instance, the five-way type is only 2⅛in. × 1¼in. × 1⅛in.

Whereas in the past maintenance mechanics were obliged to master the intricacies of individual wiring systems for each different type of aircraft, the new standard system makes their work straightforward and simple. For example, if a wing has to be detached and replaced by another, all that the electrician has to do is to unplug the leads from the connector block at the wing root, and plug in the new wing's wiring at the same connector sockets. Additionally, wiring lengths and cables can be supplied made to measure and fitted at each end with universal plug-in ferrules.

The chief cause of failure in wiring systems is moisture, which starts corrosion. This is combated by a special "honeycomb" wiring pattern ensuring moisture drainage and proper ventilation. For aircraft in close contact with salt atmosphere a special spray-proof enclosed cover houses the connector block.

The first aircraft in which the new system is incorporated is a large new British airliner, and all succeeding aircraft will be similarly equipped.

SCOTTISH AVIATION PROJECT

AN unsubsidised, global air service based on Prestwick Airport, with direct links with the European airlines and shuttle services between Prestwick and the principal cities of the United Kingdom has been planned by Scottish Aviation, Ltd. The company states it has satisfied itself that attractive fares can be offered without Government subsidy, and as an instance of this, the initial fare tables quote an £80 return fare to New York.

In the initial period it is proposed to operate the transatlantic routes with a conversion of a military transport, the conversion being made by the company, but from the beginning the overriding consideration will be the comfort and convenience of passengers, and the aim will be to provide the swiftest and most efficient point-to-point service which can be devised with the equipment available to British operators at the moment.

In the initial stages for night service to and from New York, the aircraft will be equipped as a 20-berth sleeper. The schedules, set for initial operations, provide for dinner in London and breakfast in New York. For day service the equipment will consist of 40-seat airliners, flying via Iceland, Greenland, and Goose Bay (Labrador). In addition to their 40 passengers, they will carry 6,000 lb. of mail and freight.

The airline network aimed at will provide direct connection not only between Britain and North America, but between this country and the principal cities of the northern hemisphere. The five points of the target plan are as follows: Night service to and from New York for sleeper passengers and first-class mail and freight; day service to and from Canada and the United States (via Iceland, Greenland and Goose Bay) for passengers and second-class mail and freight; direct connection between Prestwick and the European airline services at Paris, Amsterdam, Hamburg, Oslo and Stockholm; a global route around the northern hemisphere by way of Moscow, Pekin, Vladivostok, Alaska, and Vancouver, with loop lines serving Central Europe, the Middle East, Karachi, Calcutta, and Hong Kong; an internal shuttle service connecting Prestwick with the principal cities of the United Kingdom.

The Atlantic, European and internal services would be the first to be established after Government sanction has been obtained. Special provision will also be made on the Continental service for the carriage of cargo. The passenger aircraft will consist of 20-seat airliners, conversion of a smaller military transport type.

It is proposed that a substantial number of the aircraft engaged on the shuttles within the British Isles will be equipped as "Customs" aircraft, so that transatlantic passengers will be able to complete Customs and immigration formalities in the course of a short flight from Prestwick to their destination points in this country and thereby avoid any waste of time.

U.K. CONFERENCE DELEGATES

THE United Kingdom Delegation to the International Civil Aviation Conference at Chicago, which began on November 1st, consists of: Viscount Swinton, Minister for Civil Aviation; Sir Arthur Street, Permanent Under-Secretary of State for Air; Mr. W. P. Hildred, Director-General of Civil Aviation; Mr. J. H. Magowan, Commercial Counsellor, His Majesty's Embassy, Washington; Sir George London (Newfoundland); Mr. W. C. G. Cribbett, Assistant Under-Secretary of State (Civil Aviation); Mr. G. G. Fitzmaurice (Foreign Office); the Hon. A. J. Walsh (Newfoundland).

The following will also be in attendance: Air Chief Marshal Sir Frederick Bowhill, Air Office Commanding-in-Chief, Transport Command, Royal Air Force; Viscount Knollys, Chairman of British Overseas Airways Corporation; Air Comdre. R. B. Jordan, Director of Air Transport Policy and Organisation, Air Ministry; Air Comdre. H. G. Brackley, Deputy Senior Air Staff Officer, Transport Command, Royal Air Force; Maj. J. R. McCrindle, Deputy Director-General, British Overseas Airways Corporation; Wing Cdr. J. Davison (Southern Rhodesia); Sqn. Ldr. H. A. L. Pattison (Newfoundland); Mr. P. H. Gore-Booth, First Secretary, His Majesty's Embassy, Washington; Mr. G. K. Boyd-Shannon, Dominions Office; Mr. W. J. Bigg, Colonial Office; Mr. B F. St. J. Trend, Treasury; Mr. N. J. A. Cheetham, Foreign Office; Mr. L. J. Dunnett, Air Ministry; Mr. Charles Campbell, Press Officer; Mr. R. D. Poland and Mr. F. A. Butters, Private Secretaries to Lord Swinton.

Behind the Lines

Acknowledgment and Threat

"THE enemy's only trump card at the moment is his Air Force, but the day is approaching when it will be hampered and mauled badly." (From a German broadcast.)

Still Trying

MUSSOLINI'S Fascist Council has opened a recruiting drive for men between 17 and 50 to join the A.A. units operating with the German forces in Northern Italy.

Gas Production

THE Germans have considerably increased their production of poison gases during the past few months, reports the Swedish *Aftonbladet* from Germany.

Seventy factories employing a total of 500,000 workers are said to be working 24 hours a day.

The Difficult Round

COMPARING the present position of Germany with the difficulties of Britain after Dunkirk, and of the Russians at the time of Stalingrad, a Nazi newspaper says: "There is a difference between being forced to take hard blows in the first and the tenth rounds, and we have suffered reverses, so to speak, after half-time.

"Therefore our situation is psychologically and materially incomparably more difficult than theirs."

German Calculations

GERMAN air defence forces destroyed 13,309 Anglo-American aircraft during the period from January to September, 1944, says a German report.

The balance sheet of the air war as compiled by German air experts attempts to show that Allied losses were even higher. In these circles it is assumed that during the period mentioned the Allies have lost at least 16,000 aircraft, including aircraft landed in neutral countries, machines which crashed into the sea and those which crashed when landing. According to German calculations this figure includes more than 10,000 four-engined bombers.

These figures are given in order to show that the *Luftwaffe*, even in its defensive rôle during the past nine months, possessed a defensive strength of some importance. "The high number of enemy aircraft shot down, particularly by our fighters and A.A. guns"—it is said—"were destroyed under very difficult conditions."

A considerable change will take place in the air situation—says a German report—once the German "Lightning fighters"—the new German type of aircraft operating in only small formations at present—have imprinted a new face on the air war.

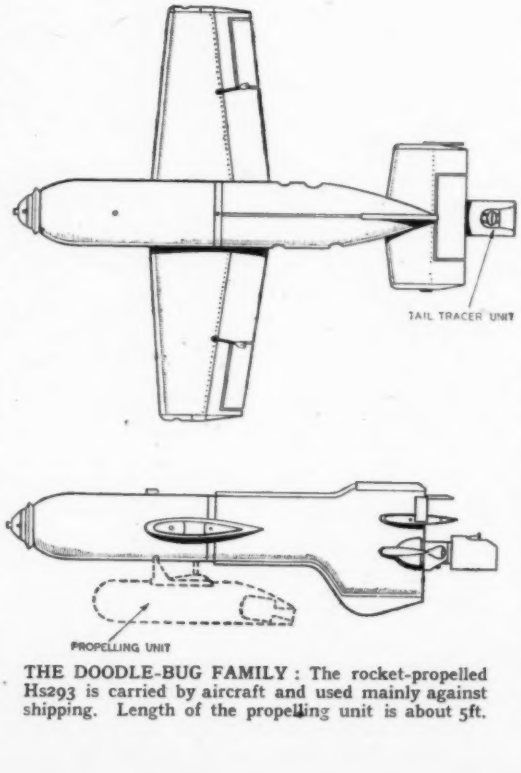
Service and Industrial News from the Inside of Axis and Enemy-occupied Countries

Priority No. 1

NO. 1 priority has been given to the creation of "a new air arm by the German High Command in their preparations for the winter campaign in the west."

German Steel Supplies

AN article in a neutral periodical creation of "a new air arm by the Tottering" states: "The iron and steel producing districts of Luxembourg and Belgium lie just in front of the West Wall. The Allies have succeeded in making their first break through in such a way that there is hardly any prospect of the Germans being able to keep these deposits. But even if the Allied armies could be held up in front of the West Wall, *Germany's iron and steel supply has received such a blow that it cannot be repaired* in view of Germany's steel requirements. Both the Saar and the Ruhr lie so close to the Allies' airfields in France that nothing can prevent these production centres from being subjected to area bombing. It was this method of attack which enabled the Allies to sweep past the strongest lines of defence and which would 'rub out' the industrial plants of the Saar and Ruhr even if the West Wall were to hold."



THE DOODLE-BUG FAMILY: The rocket-propelled Hs293 is carried by aircraft and used mainly against shipping. Length of the propelling unit is about 5ft.

Petrol Evacuation

A Norwegian underground paper reports it has fresh evidence that the Germans are sending petrol to Germany from their stocks in Norway.

Pruning the *Luftwaffe*

ANOTHER *Luftwaffe* fighter ace, credited with seventy-eight air victories, Major Walter Höckner, commander of a *Gruppe*, has been killed in action. He was engaged on operations against Allied bombers, and was awarded the Oak Leaves early this year.

Otto Heinrich, a bomber ace, who was recently decorated by the Fuehrer with the Knights Cross to the Iron Cross, has been killed on the Western front.

Preparing for Air Blows

"UNDOUBTEDLY," says a German commentator, "we are now witnessing the enemy's deployment for an intensified air war which may one day be directed against one and the next day against another district, and the aim of which will be to undermine and destroy the moral and material advantages gained by our conduct of the war in recent weeks in a tremendously hard and trying process."

The Hs293

ONE of Germany's reaction-propelled flying bombs, incorrectly called the glider bomb, is the Hs293 built by the *Henschel Flugzeugwerke A.G.*

Carried usually under the wings of such types as the He 177, the Do 217E or the Fw 200, the radio-controlled, rocket-propelled Hs293, is used mainly against shipping.

It is composed of a relatively small fuselage which carries a pair of wings, tail surfaces and vertical fins, a tail tracer unit and a rocket-propulsion unit. The forward part of the fuselage is the bomb body (total weight about 1,300 lb.), while the rear section houses the radio-controlled automatic pilot and its control unit.

When released from the parent aircraft, operation of the propulsion unit and the tracer unit is initiated and the bomb fuse is armed. After launching it is immediately brought under radio control from the parent aircraft, which is effective over a range of about five miles, although the usual practice appears to be to release the missile two or three miles from the target.

The Hs293 is said to be reasonably manœuvrable; its height can be maintained and corrected. While most versions function on impact, one type, presumably used against bomber formations, is equipped with a radio impulse fuse.

The Hs293 has an overall length of 12ft. 4in. and a span of 10ft. 3in. With a total weight of about 2,000 lb., the maximum speed is reported to be about 300 m.p.h.

The Air and Shipping

Last Week We Recorded the Plans of the Railway Companies for Post-war Commercial Flying : Here are Some Ruminations on the Place of the Shipping Companies

By "MACVIATOR"

CIVIL aviation controversy and doubt are rampant in almost every country with aspirations to participation in the coming air age; over the "chosen instrument," domestic or foreign, subsidised or otherwise, with cabotage reserved or not, restriction and rigidity of routes, frequencies and fares. All these go to make the, to my mind, paramount consideration a matter of confusion worse confounded, viz., the rôle which the steamship companies of whatever nationality will be allowed to play in the realm of travel, domestic or international, by air. The shipowners have created a situation, partly by their pre-war activities, partly by the vicissitudes of war, which gives them first consideration as the possessors of the instruments to maintain national prestige and commerce abroad. Briefly, no aircraft for them, fewer ships will be operated, less British and foreign trade will be carried in British transport vehicles, with consequent loss to the foreigner of that foreign exchange which will be, more than ever in the past, required by our Exchequer. And yet there are some who decry the shipowners in every country. Here in Britain their position is not understood, misrepresented; they are accused of seeking to enter air transport merely as a means of sabotaging it in favour of their ocean connections, to kill civil aviation. Utter nonsense!

Our Members of Parliament are not exempt from the charge of ignorance; their views receive world-wide publicity in quarters which aim at the reservation of air transport to purely air liner companies and corporations divorced entirely from the ship or the truck or any other form of transport. A bad impression is thereby created in the minds of the foreigners who, owning a few aircraft under their national flag, wish to keep others out of the air over their sovereign territory. And this restriction of business in or over sovereign territory is called, generally, cabotage, a term much misunderstood. It has a long history in shipping. It has been borrowed for civil aviation and misapplied.

Air Powers for Shipping Companies

Reverting to ignorance, and its prevalence in circles which should know better, may I relate two incidents? Within the past month I asked the editor of a newspaper associated with shipping and shipbuilding, "How many British steamship companies, do you think, have acquired Air Powers?" "About eight, ten or a dozen." "About seventy, if you allow for a half-dozen or so who have acquired Air Powers since I compiled my list of them," was my reply. "No?" "YES." I put the question to the editor of a weekly specialising in aircraft construction and performance, and had an answer which put the top figure at the score instead of the dozen (above). His surprise was great, and I hope that this disclosure of the interest of the British shipowner in post-war air transport will be taken to heart by the prejudiced and given the earnest consideration it deserves.

If it is the intention of the shipowners to sabotage civil air transport, then they must assiduously be preparing a solid phalanx. And they have the money, alas, with which to do it. Millions of pounds are at their disposal, insurance compensation for the loss of fine passenger and cargo vessels in the common cause since the autumn of 1939. Sabotage! Rather it is a fight for their existence, which can remain to them only by the combination of the ship and the plane under the same management and control.

The four British railway companies have all steamer connections with Continental Europe, or with the outlying islands that surround the mainland of Britain. Aircraft can go where the train cannot, and faster, without change *en route*, than the ship. The railway men, like the shipowners and their steamers, do not view with equanimity the prospective loss of traffic which the steamers or the railways will suffer, and they have decided to make of aircraft and the train a combination in post-war air transport as successful as was that of the steamer and the train in pre-war days. Ways and means are under consideration; this is preliminary and preparatory to receiving Government permission to fly, or to organise beforehand, routes with frequencies and fares in accordance with the exigencies of the developing traffic. The railways are but one group, a large one at that, seeking to operate.

International Air Traffic Operators

Another important group is C.I.A.T.O., the abbreviation for Conference of International Air Traffic Operators. Amongst the British members are (a) Air Dispatch, Ltd.; (b) North-Eastern Airways, Ltd.; (c) Overseas Transport Co., Ltd.; (d) Western Airways, Ltd.; (e) representative air lines of 13 of the nations at war with the Axis Powers; and (f) the British-Latin American Air Lines, Ltd.

The latter is the outcome of the strictures made by the late Mr. Justice Bennett in sanctioning air powers to one or another of the steamship companies in the trade between this country and South America. Five steamship companies have placed their whole resources behind this air line, viz., the Royal Mail, the Blue Star, the Booth Line, Lamport & Holt, and the Pacific Steam Navigation Company. The Booth Line penetrates inland up the Amazon. The others encircle the continent, east and west coasts. If and when it commences to operate it has to penetrate into preserves created for themselves by Pan American Airways and the Grace Steamship Company, and most, if not all, of the S.A. Republics who have jumped into "national" air operators with the help of the advice, experience and aircraft of Pan American. If and when. The "if" depends upon the policy which the Cabinet is expected to formulate some day. "When" apparently will not be while hostilities continue. What hostilities? In Europe? Later in the Far East? During mopping-up time?

Somehow or other much was expected from the present session of Parliament. It seemed to start off well. On the opening day Lady Apsley asked the Secretary of State for Air whether permission or facilities would be granted to air transport companies operating in this country prior to 1939 to enable them to resume their services on air line routes before the cessation of hostilities in Europe. Sir Archibald Sinclair, in a *written* reply, said: "Operations in wartime are governed by the Air Navigation (Restrictions in Time of War) Order, 1939. It would not be expedient while hostilities continue to increase the number of separate organisations operating in aid of the war effort in this country." Note well. Lady Apsley specifies Europe. Sir Archibald is ndefinite. Nor is he explicit as to whom it would not be expedient. To B.O.A.C.? The more air lines, with their pre-war experience, that can be lined up in the war effort the better would it be for a successful operation against the enemy instead of leaving it all to one organisation which has lost gradually many of its best business men with vast operating experience since the war began.

Airborne Forces

Principles of Their Use Explained

LIEUT.- GEN. F. A. M. BROWNING, C.B., D.S.O., read a most interesting paper on airborne forces at the Royal United Service Institution on Wednesday, October 25th.

He started by enumerating the objects for which airborne forces ought to be used. In modern war, he said, a difficulty which confronted every General was to find a flank on the enemy's position which could be turned. Aircraft could always find a flank by flying over the top. Another object was to effect surprise, and a third was to surmount water obstacles. Airborne troops could also be used for sabotage, and both agents and arms could be dropped from the air.

Major operations had, however, only recently become possible with the development of the four-engined aircraft. Men had had the idea in their minds for thousands of years; but in recent times developments started in the Russian Army, which introduced parachute troops. The Russians, however, had not exploited the idea to any great extent in the present war. General Browning thought that this may have been due to the Russians' limited powers of constructing aircraft for the purpose; and perhaps, too, on such a long front airborne troops might have been swallowed up in the general armies.

The Germans were the second nation to take up the idea, and they added gliders to the parachute troops. They had always envisaged the possibility of transporting heavy guns by air. But the episode of Crete put an end to German developments. They succeeded there because they were willing to sacrifice men in numbers in order to succeed; and also on account of the inadequacy of the defences and the absence of air opposition. But they got a shock at Crete, and it stopped their development of airborne forces. Since then the Allies had mainly met German parachutists fighting on the ground as infantry, and as such they were always of the very highest class.

The British began to develop airborne troops in 1940, and the Americans made a start soon after. The two have worked closely together. Our first experiments were on a small scale at a station in the North. Early in 1941 we had got an airborne commando; by September of that year we had a brigade; and presently we arrived at a division.

General Browning said that it was a basic principle that aircraft should only be asked to carry the very best; in the first place the very best men, and, secondly, the very best equipment. They must have a balanced force.

Naval Shooting

The organisation between the Army and the Air Force works well, and Gen. Browning said that no change was contemplated. It was also necessary to have a good understanding with the Navy. The first thing required of H.M. ships was that they should not shoot the aircraft down! The lecturer considered the situation of the warships, explaining that when they were bombed they could not scatter rapidly like infantrymen or dive into slit trenches; and so it was natural that they should be inclined to shoot first and enquire afterwards. They had shot first at Sicily, with dire results to our aircraft.

So now the airborne forces asked the Navy to give them a route which would keep them out of that sort of trouble, and that plan had worked well in the case of the landings in Normandy.

Gen. Browning foresaw further work with the Navy in the Pacific campaign. The airborne forces might require an escort of fighters from the carriers.

The lecturer turned to the training of his troops. The parachutists were all volunteers and they had to be very good and very tough men. Naturally commanding officers did not like giving up many of their best men. The initial training of the men was hard. It was deliberately made so, as, if a man had to be rejected, they wanted to find that out before much time and trouble had been spent on training him. Eight jumps qualified a man for his "wings," and they found that most men became so parachute-minded that they were apt to forget that their real work began after they had reached the earth. It took some time to instil that into the men. Parachutists, said Gen. Browning, have a curious make-up, and they develop a feeling of moral superiority over other men.

Airmen Soldiers

The glider pilot must be both an airman and a soldier. Training in both rôles is quite necessary, and Gen. Browning said he was indifferent as to whether a man was a soldier trained to fly or an airman trained to fight on the ground, so long as he did get both trainings.

The air-landing troops (i.e., those who travel by glider) are not volunteers; but in a sense they are picked men. That is to say, any man who proves unsuitable is rejected.

Airborne troops have a high percentage of officers and N.C.O.s. All are encouraged to think for themselves. For instance, the decision to cut down the number of parachute containers and to make each parachutist jump with a kitbag was made as a result of a corporal's suggestion.

Gen. Browning said that already they had dropped a jeep and a six-pounder gun from a Halifax.

Getting the troops to exactly the right spot at exactly the right time was, he said, much the most difficult operation the R.A.F. has to do. In Sicily they were dropped over a front of some 90 miles.

The dropping in Holland was much more accurate. Arnhem, he said, was nearly a success.

Tactically it was necessary for the main ground Army to link up with the airborne troops in not over 48 hours, at least with its artillery fire. Either the airborne troops must link up with some success by the ground Army, or *vice versa*.

Emphasising again the necessity of large-scale operations from the air, Gen. Browning ended his lecture with the words, "You can't do these things big enough."

LUFTWAFFE SENDS UP ITS BEST PILOTS NOW

ALLIED pilots operating over Germany are now meeting the cream of the *Luftwaffe*, up in force every flying day to defend the Reich itself, according to Reuter's Special Correspondent.

"German pilots are no longer the green boys they sent out to defend the far outposts of their country," said a Thunderbolt pilot, Major Harold Sparks, of Frankfort, Kentucky, who has flown over the Ruhr in recent days.

"Now that the Fatherland itself is under attack they have sent in the real thing.

"They are good front-line fliers, and as the *Luftwaffe* has nothing to replace them they are under orders to bale out whenever they are caught at a disadvantage and so save their lives to fight again."

"Attacks on railways have become increasingly hazardous as the Germans, striving to preserve them, throw in more fighters and tricks. Railbusting is no longer the picnic it was in the Normandy days," said Major Sparks.

"With the battle almost within sight of their chimney tops, the little factories of the Ruhr are still working at top speed for Hitler's failing war effort.

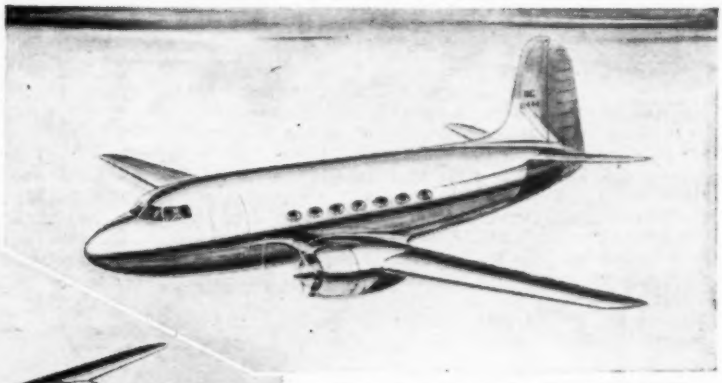
"It is just like a peacetime boom with soot and sparks streaming from every little building," said the Major.

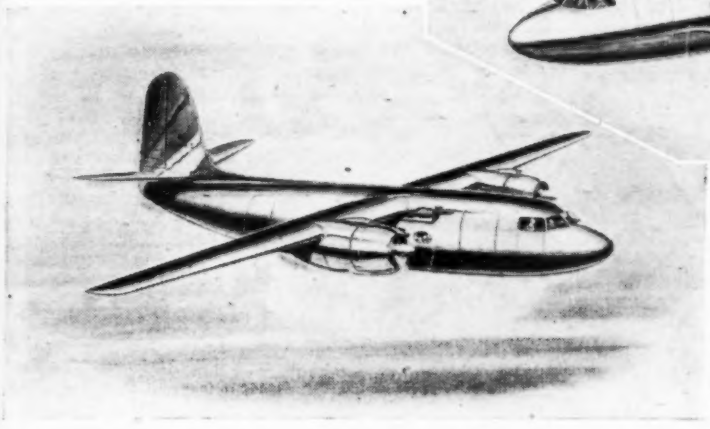
"Pilots are constantly remarking on it as they sweep over the little factory land between the big towns and the front. They are certainly turning out the stuff in a hurry."

Although railway lines have so far been the principal targets in the Ruhr for American fighter-bombers, they are now going to hit factories and everything on either side of the Rhine.

New Martin Transport

High- and Low-wing Versions with Tricycle Undercarriages : Rapid Passenger/Freight Conversion a Special Feature

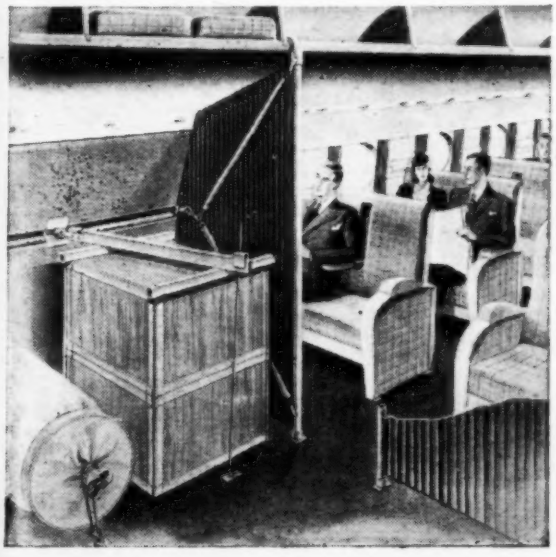




(Above) The low-wing version of the Martin 202, and (left) the same aircraft in high-wing guise, giving the advantage of a low loading-level for handling freight. A tricycle undercarriage is common to both.

A SHORT-RANGE, 30-passenger, twin-engined, post-war transport designed specifically to meet requirements set up by the Air Transport Association of America has been announced by the Glenn L. Martin Company, Baltimore, Maryland, which has submitted preliminary data and drawings, together with a complete engineering study to the Association's Aircraft Requirements Committee and to the airlines.

Designated the Martin Model 202, the new aircraft features unique provisions for rapid conversion from passenger to cargo or combined passenger-cargo service. The preliminary designs also provide for both high- and low-wing versions, alternative power plants, alternative seating arrangements and a choice of three wing loadings to meet various airport requirements.



SIMPLE DIVISION : An adjustable bulkhead, claimed to be unique, provides for variations in cargo and passenger space as required on any flight. Built-in cargo ties are provided, and complete conversion from passenger to cargo takes only 20 min.

The three basic models—the 202-11 and 202-12, low- and high-wing versions designed around the 1,600 h.p. Wright Cyclone engine, and the 202-15, similar to the 202-11 but designed around the 1,500 h.p. Pratt and Whitney "Double Wasp" engine—meet all A.T.A. requirements for what is known as an A-1 class transport except the size of airport from which they must operate. Here it was found that the most economical specification had a wing loading which required a 3,250ft. runway at sea level. However, with slight modifications, the 3,000ft. runway requirement can be met at a very small sacrifice in operating cost, while models designed to operate from both 2,900ft. and 2,500ft. runways were included as alternative versions.

The basic models of the 202 are designed to operate over a 500-mile range at a cruising speed of 250 m.p.h., or nearly 40 per cent. greater than that of present-day standard airliners, carrying the same crew—pilot, co-pilot and stewardess—and 40 per cent. more payload than contemporary transports.

Passenger- and cargo-handling facilities in the 202 include two large hatches—one forward and one aft—at lower than truck height; a movable bulkhead or wall which slides back as seats are removed to separate cargo and passenger compartments, thus varying the size of each compartment according to the number of passengers and amount of cargo available for each trip (standard cargo tie-down fittings permit a complete conversion in 20 minutes or less) and specially designed demountable seats, the backs of which may be folded back against the fuselage wall as protective padding during cargo operations, with cushions stored in the overhead hat racks. As an added convenience for passengers, a compartment for hand luggage is included just inside the entrance so that air travellers can bring their own bags aboard and have them available throughout the flight.

Both high- and low-wing designs have been prepared, the former offering better passenger visibility, ease of loading and unloading and reduced ground time, while the latter provides shorter landing gear and reduced weight empty. In both cases tricycle landing gear provides added convenience in loading and unloading, and a level floor at all times.

American Letter

Random Impressions of People and Things of Interest to British Readers

By "DEMRON"

SOME of the old stalwarts of the Midland Aero Club at Castle Bromwich may recall a pupil by the name of Aherne, tall and good-looking, who took his licence there some years ago. Well, Aherne is still a pilot, and has piled up some 700 hours or so in California, instructing and doing other worth-while jobs, in addition to making his name, Brian Aherne, a household word with movie audiences throughout the world. Brian's love of flying has never diminished, and in addition to being a practical pilot, he has interested himself in many aspects of aviation. He has been more than passively interested in the All-American Pick-up system which has been in use for some years in America to provide air mail services to the more isolated centres, and which was employed by our glider troops in Normandy.

To see the R.A.F. wings on the right breast of a U.S. Air Corps officer, denoting, of course, Eagle Squadron, is not an uncommon sight when walking down Fifth Avenue, New York, but to spot an R.F.C. wing on the left breast of a U.S. Army officer is unusual. I ran across Col. Borkum in the Waldorf a few nights ago thus distinguished, and he told me that there are only two or three officers in the U.S. Army who can sport the R.F.C. wings. He acquired them through enlisting in the Canadian R.F.C. in the first world war before America entered it. He had to have the set made in New York, as apparently R.F.C. wings were unobtainable either there or in London.

Another impression one gets walking down Fifth Avenue —probably in Piccadilly, too—is the variety of campaign and decoration ribbons emblazoned on so many American chests. The boys of the R.A.F., Army and Navy one sees so frequently these days in New York look singularly naked in this respect, even after four years or more in actual theatres of combat.

Airline Applications

The Civil Aeronautics Board in Washington is being flooded with applications for post-war air line routes, feeder lines and helicopter routes. The future of air transport is certainly attracting a lot of attention as these applications have been filed by so many varying types of aspirants, ranging from the old-established air line companies to those who hope to be established in the not too distant future. The C.A.B. is considering some of the more important international applications, although at the moment the "war" between Pan American Airways and the domestic companies does not appear to have resulted yet in a firm statement of policy. The large domestic companies which, up to the beginning of the war, concerned themselves entirely with internal and coast-to-coast routes, have extended their tentacles to reach to all parts of the globe, under pressure of emergency and the unprecedented demand for air transport of troops, freight, and priority passengers, operations which had probably existed only as a vague dream to them before hostilities. Having tasted the savour of international transport and, incidentally, having put up a wonderful performance, these companies naturally wish to continue, commercially, the operations they instigated under national pressure, and have certainly acquired the operating experience to enable them to justify their claims of being responsible and competent parties for the operation of such routes.

On the other hand, Pan American, having commercially pioneered practically all of the international routes from the U.S. have been somewhat in the position of B.O.A.C.—a "chosen instrument" of the Government. Whether the representations of the domestic companies will suffice to eliminate the implications of monopoly which they contend exist, or whether "Pan Am." will continue to function as the national company for operation of international routes, remains to be seen, but the fight will be keen, and, judging from the applications now before the C.A.B. the internal companies are proceeding on the assumption that they will be permitted to extend their activities.

An interesting angle is developing as a result of the many applications for routes now lodged with the C.A.B. Many of the pilots now serving with the Forces are naturally wishful of being associated in some way with air transport developments, and feel that, whilst they are abroad they may be missing the opportunities that might be available to them if they were at home, and that plums will be secured by interests that are able to formulate their plans and act now, which, with other much more serious matters to engage their attention, these pilots obviously cannot do. A movement is likely to be set on foot, with the support of the American Legion, suggesting that these applications for routes be deferred, until those serving abroad are able to give the matter their full attention.

Greyhound Helicopters

History is almost repeating itself over here in the matter of the helicopter which, apart from achieving considerable progress to the practical stage, has undoubtedly gripped the imagination of the American public. Certainly the fact that the Greyhound Bus Company, which runs transcontinental bus services, has filed a comprehensive application for something like 60,000 miles of helicopter routes, has not done anything to minimise public conviction that the helicopter has come to stay.

In my travels throughout the States I have seen many incipient world-beaters in rotating wings—at least, according to their energetic sponsors. Some of the experimental models I have seen are distinctly interesting, and these experiments do not find it at all difficult to interest sufficient capital to see the schemes through to fruition. Many of the largest firms in the industry have a helicopter either completed, in process, or designs for one in their experimental shops. Two, three and four-blade rotors, rotors at front and rear and contra-rotating, superimposed rotors are all attracting their adherents, inspired, naturally, by the success of Igor Sikorsky, whose determination and skill produced the first practical helicopter in America.

A year or so ago I attended a "QB" dinner in New York—the Ancient and Secret Order of Quiet Birdmen is an exclusive pilot organisation; some of the toughest old barnstorming pilots were there, and Igor showed a very interesting coloured movie of his first successful machine performing quite astounding evolutions. I was much impressed by the way these old-timers, conservative as pilots are, chary of anything new and refusing to accept anything revolutionary without the most comprehensive test, burst into spontaneous applause half-way through the film. In its way I thought this was one of the finest compliments Sikorsky has had paid him.

For some time there has been a good story going the rounds about Sikorsky's early experiences with his helicopters. I thought it somewhat libellous, or at least apocryphal, until I heard Sikorsky tell it against himself. It seems that he had movies taken of his early flights, and when a reel or so had been compiled, a showing was made to the president of his company, who, after seeing the film, agreed that it was extremely interesting. He complimented Sikorsky, and then said, "Tell me; you have shown me pictures of your machine taking off without forward run, climbing and descending vertically, taking off and travelling sideways, even going backwards, but I cannot recollect seeing it going forward." Sikorsky had to agree that his

(*Concluded at foot of page 483*)

Miles DESIGNS FOR THE TIMES

M I L E S M A S T E R

The merits of any aircraft must be considered in relation to the conditions prevailing at the time it was designed . . . and by this or any other criterion, the Miles Master has proved to be a truly remarkable machine.

In 1939 the need was for "monoplane trainers for monoplane pilots"—and Miles foresight made the plane available. "Without it," said "The Aeroplane," "the steady flow of pilots to our fighter squadrons could never be maintained." The ability of Miles Aircraft Ltd. to provide "designs for the times" ensures their pre-eminent position in aviation of the future.

Miles AIRCRAFT LIMITED, READING, ENGLAND

Pressurising the Flying Boat

"Pressurising" is becoming a necessity for long range air transport. The impression that flying boats are not suitable for pressurising is erroneous. In the large flying boat the hull structure can be made suitable for pressurising, and as for weight, it should be remembered the whole forward and midships construction has already to be robust enough to withstand high water pressure! Pressurising is as satisfactory in the flying boat as it is in the landplane—either in single or two-deck arrangements. The British love a well-found boat and will appreciate the greatly improved seaworthiness and operational qualities of the large flying boat.

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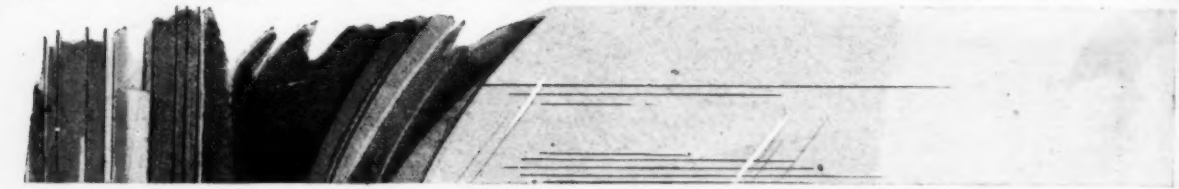


SUPREME FOR OCEAN TRAVEL – THE BRITISH FLYING BOAT

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

JET PROPULSION

Advantages of Twin Units

I WOULD like to reply to your correspondent, Mr. Charles, on jet propulsion. He seems to think that because the Aircomet has a full height u/c, and more head resistance than the single-jet-plant aircraft, the twin-jet-unit aircraft are not worth while. He seems to forget that on the single-jet fighter an air passage has to be provided from nose to tail. This compels a designer to place his fuel tanks and armament in the wings, where there is little room. So the twin-jet fighter shows these advantages: (1) It has a longer duration; (2) a heavier armament; (3) it is easier to maintain; (4) a more roomy cockpit.

JACK PLATT.

THE FLYING BOMB

Did the Hun Forget Centrifugal Force

WHILE sincerely complimenting *Flight* on the general excellence of the article in the October 5th issue, by W. S. Shackleton, on the flying bomb, so admirably illustrated by Max Millar, I should like to raise a query about the observed behaviour of this missile as compared with the explanation given by the writer as to what happens at the end of its flight. Please accept it that this point is not raised in any spirit of adverse criticism, but in a genuine desire for enlightenment.

Mr. Shackleton explained that, at a moment predetermined by the setting of the windmill-driven counter, spoilers or tabs are brought into operation on the elevators which plunge the bomb earthward and that the stopping of the jet unit was an *unintended effect* caused by centrifugal force starving the fuel jets. Indeed, it has even been claimed in the lay Press that the Germans did not know the engine stopped and that this saved many London lives.

Like any other Londoner, I saw and heard more of these things than I wanted to, sometimes at rather closer quarters than was really comfortable, but in no instance did the missile's behaviour *appear* to conform with the sequence of mechanical events described. Of course, there were several hundreds of them that I neither saw nor heard which may, for all I know, have behaved in a way completely in accordance with Mr. Shackleton's description. If so, it would be interesting to hear from someone who did witness it.

However, my own experience of the "doodle bug" did not include a single instance in which the engine stopped *after* level flight had changed into a downward curve—which is surely what would happen if Mr. Shackleton is right.

One or two plunged into the deck with the jet unit still going strong, which means the elevator trip mechanism worked as intended but that the resultant forces set up *did not* interfere with the functioning of the power unit. In the great majority of cases, however, the *first* thing that happened was the stopping of the jet unit, as a result of which the bomb either stalled in, or continued in a glide for widely varying distances; sometimes the glide was steep (approaching a dive, in fact) and sometimes it was surprisingly flat and long. This suggests to me that in by far the majority of cases the missile either conked out of fuel before it was meant to, or that a defect developed—possibly burning of the flap-valves.

My grudging conclusion, therefore, is that the wily Hun did *not* make any silly mistake about the effect of centrifugal force, but that the V.1 worked *exactly* as intended on the relatively few occasions when this was not prevented by shortage of fuel or some mechanical defect.

As for the cutting of the engine in mid-air (whatever the cause) saving lives, I seriously question this line of reasoning. Surely if the thing's normal habit was to plunge suddenly down *without* giving this preliminary warning, then people would have taken cover the second they knew one was approaching. As it was, they got into the habit of imagining that so long as the jet was working they were safe, and, therefore, there was a general tendency to stand and watch the doodle bug go over and not dive for cover until they "heard the silence." This must have cost many lives which might otherwise have been saved.

"ANTI-SQUIRT."

INTERNATIONAL AUTHORITY

With Armed Strength to Enforce Decisions

IT is disturbing to find that there is still opposition in this country to the creation of an International Police Force, which alone can make international authority effective. The new world authority may prove no more effective than the League of Nations, unless it commands sufficient armed strength to enable it to enforce its decisions.

An International Force has been advocated for many years by France; it was once proposed by New Zealand, and it appears to have been put forward at the Dumbarton Oaks conference by both China and Russia. On each occasion the idea has been discouraged by Great Britain, whose consistent refusal to create a practical plan for collective security was a contributory cause of this second world war.

This problem of power behind the League appears to be the crux of the matter now as it has been in the past. It is the test of sincerity that nations intend to accept the ruling of the international authority in matters of fundamental common concern.

R. FULLJAMES (Grp. Capt.).

AMERICAN LETTER

(Concluded from page 482)

observation was correct, and pointed out that going forward was at that time the only thing he had not been able to achieve!

NEW YORK.—La Guardia Field.—Ten years ahead of its time, but even now not large enough to accommodate traffic. A seething mass of air travellers—more like a busy railway station than anything else. Close to the city and handles flying boats as well as landplanes. Soon to be superseded by the vast new airport at Idlewild.

ALBUQUERQUE.—New Mexico.—A lovely spot either in daytime, or at night with the enormous runways alight. 5,000 feet altitude and shielded by rugged mountains. "Air like wine."

WASHINGTON, D.C.—Beautifully designed and laid out. One of the finest in America—but oh, the Washington humidity!

EL CENTRO.—Southern California.—Close to the Mexican border, and in the fabulous Imperial Valley made famous in "The Winning of Barbara Worth." Blistering heat but congenial company. How cool a really cool drink can seem!

VANCOUVER.—British Columbia, Canada.—"Something nice to come home to" after an electric storm at night over the Rockies. Lush and beautiful with something of England round about.

THE HANDLEY PAGE HERMES

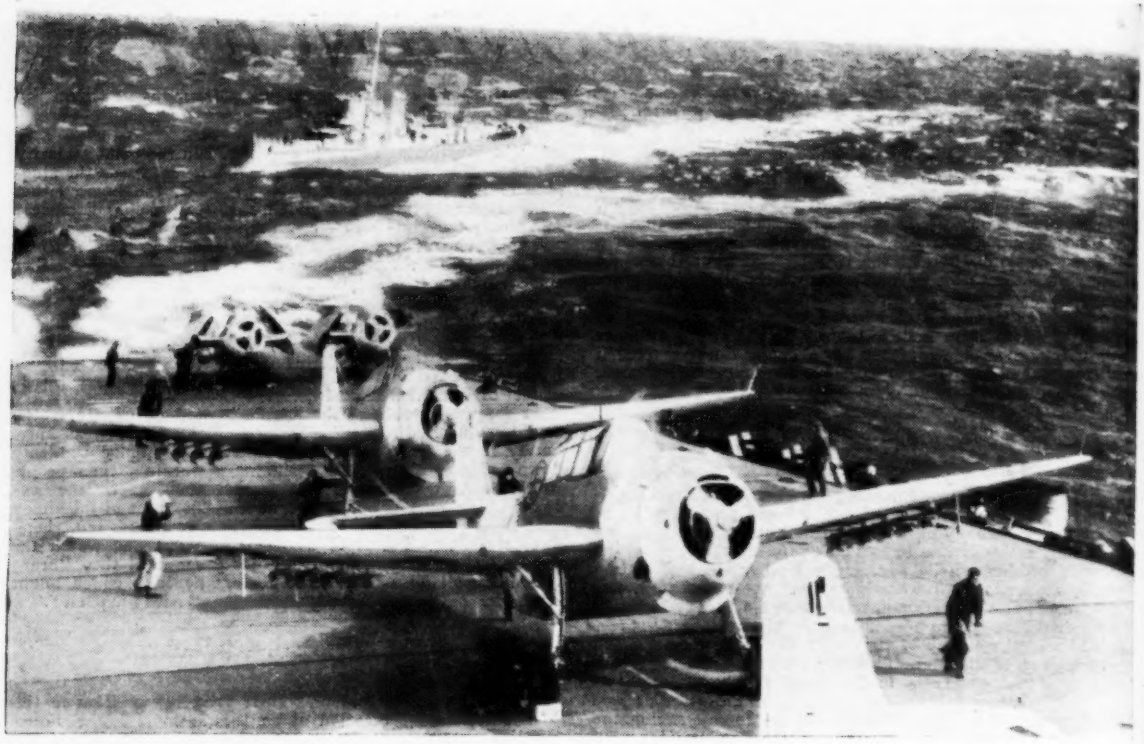
Cannot the Camel Kneel?

MAY an enthusiastic reader be permitted to congratulate *Flight* on its attractive presentation of the descriptive article on the Handley Page Hermes. The use of a little colour in the drawings of the accommodation plans helped marvellously in sorting out furniture from walls and floor. Now that *Flight* has taken the plunge into colour printing—the first British aviation journal to do so—may we hope to see more of this? Colour seems to offer almost endless possibilities in making even clearer the already excellent drawings which appear, and its use would thus have an educational as well as an artistic value.

In your description of the H.P. Hermes you comment on the choice between the tricycle undercarriage and the orthodox wheel-behind type, pointing out that in the one case the door is high above the ground, and in the other the passengers will have to scramble up a steeply sloping floor. Camels are trained to kneel while their passengers embark and disembark (or should it be encamel and disencamel?). Would it not be possible to fit the Hermes with a tricycle undercarriage and "train" this to kneel during the emplaning and disemplaning process?

Hydraulic rams are used to raise cars off the ground so as to facilitate work on their interior economy. Why should not somewhat similar rams be installed at main airports to raise large aircraft to the "wheels-down" position, if the work is beyond the capacity of Messrs. Dowty and Messier?

"CAMELEER."



GRUMMAN ATTACKS : Rocket-firing Grumman Avengers of the U.S. Navy with their escort of long-range Grumman Wildcats before take-off from a carrier to raid the Philippines. The rockets appear to be the type used by the R.A.F.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News and Announcements

Awards

Fleet Air Arm

THE KING has been graciously pleased to approve the following award :—

For bravery and skill in an attack on an enemy destroyer off the coast of Norway :—

Distinguished Service Cross

Temp. Sub Lt. (A) D. McLACHLAN, R.N.V.R.

Royal Air Force

THE KING has been graciously pleased to approve the following awards in recognition of gallantry displayed in flying operations against the enemy :—

Distinguished Service Order

Act. Flt. Lt. L. H. BAVEYSTOCK, D.F.C., D.F.M., R.A.F.V.R., No. 201 Sqn.—Flt. Lt. Baveystock continues to set the highest example of skill and leadership. His record as captain of aircraft is one of consistent efficiency and devotion to duty, and his work has contributed much to the success of operations against the enemy's surface and under-water craft.

Act. Wing Cdr. C. A. MATON, R.A.F.V.R., No. 502 Sqn.—This officer has an outstanding record, having been engaged on operational flying since the beginning of the present war. During the Battle of Britain, as navigator-gunner he flew on night flying patrols, completing 92 sorties. Following this, Wing Cdr. Maton served for a while as a staff officer in Coastal Command, later voluntarily relinquishing his acting rank to resume operational flying. As flight commander his outstanding leadership, personality and personal example materially contributed to the splendid spirit of his squadron. Since May, 1944, this officer has been in command of his squadron and has flown with every crew, participating in many dangerous and hazardous missions.

Flt. Lt. G. B. SINGLEHURST, D.F.C., R.A.F.V.R., No. 542 Sqn.—Flt. Lt. Singlehurst has been engaged on photographic reconnaissance duties since the autumn of 1941. Prior to this he had completed 28 anti-submarine patrols. Throughout two tours of operational duty he has displayed outstanding enthusiasm and great devotion to duty. This officer is a pilot of exceptional skill and ability, who has flown on sorties over Norway, Germany and occupied Europe. He has also completed many bomb damage assessment sorties, flying over the enemy's most heavily defended areas immediately after a bombing attack. With great coolness and determination Flt. Lt. Singlehurst has always succeeded in evading both enemy fighter opposition and anti-aircraft fire and has obtained many excellent photographs.

Sqn. Ldr. L. N. AHERN, D.F.C., R.A.A.F., No. 112 Sqn.—Sqn. Ldr. Ahern has taken part in the campaigns in the Western Desert, North Africa, Sicily and Italy. His ability as a pilot has been outstanding. On several occasions his aircraft sustained severe damage from anti-aircraft fire and once he was forced to make a crash landing, fortunately just behind our own lines. Since he has been in command of his squadron, he has led many successful and spectacular missions which have resulted in the destruction or damaging of numerous mechanised vehicles, tanks, road and rail bridges and a number of ammunition dumps which exploded. He has personally destroyed three enemy aircraft on the ground and damaged two Fw 190s in air combat. The high standard of efficiency and superb example of courage set by Sqn. Ldr. Ahern has been beyond praise.

Act. Wing Cdr. J. WALLACE, D.F.C., R.A.F.O., No. 13 Sqn.—Wing Cdr. Wallace commenced operational flying in 1940 in the Sudan. Since the award of the D.F.C., he has acted as Senior Staff Officer at Headquarters and as commanding officer of his squadron. His organising ability, tact and knowledge greatly assisted in the operating of the squadron. Wing Cdr. Wallace has completed numerous sorties during this period. On one occasion when extremely adverse weather prevailed, he was the only pilot to reach and bomb the target successfully. His outstanding record, enthusiasm and determination have been commendable at all times.

Act. Sqn. Ldr. J. H. BROWN, D.F.C., R.A.F., No. 6 Sqn.—As flight commander, Sqn. Ldr. Brown has planned and led many attacks against enemy shipping. During May, 1944, he was appointed squadron commander. He led many anti-shipping attacks often in the face of intense enemy fire. At all times this officer has displayed courage and skill of the highest order. He has contributed to the destruction of several thousand tons of enemy shipping, including a small merchant vessel besides numerous smaller craft.

Flt. Lt. E. BALDWIN, D.F.M., R.A.F., No. 139 Sqn.—One night in July, 1944, Flt. Lt. Baldwin was captain of an aircraft detailed to attack Berlin. On the bombing run the aircraft was hit in several places by anti-aircraft fire. One piece of shrapnel pierced the suction line to the blind-flying instruments and rendered them unserviceable. Undeterred, Flt. Lt. Baldwin continued the bombing run and completed a successful attack. Shortly after leaving the target area he was pursued by an enemy fighter. Flt. Lt. Baldwin decided to take refuge in a cloud, but with his blind-flying instruments out of action he lost control of the aircraft, but evaded the fighter. After losing considerable height, control of the aircraft was regained and a safe flight to base was made. This officer has completed very many sorties. His courage, determination and devotion to duty are worthy of the highest praise.

Act. Flt. Lt. H. A. WALKER, D.F.C., R.C.A.F., No. 138 Sqn.—Since being awarded the D.F.C., this officer has completed many sorties, most of which have demanded a high degree of skill and courage. The successes obtained are a fine tribute to his fine fighting spirit and unfailing devotion to duty.

Flt. Lt. F. L. DODD, A.F.C., R.A.F.V.R., No. 544 Sqn.—As pilot and observer respectively, this officer and airman have completed many sorties and have displayed a high standard of skill and devotion to duty. In July, 1944, they completed a reconnaissance of many hours' duration in the face of extremely adverse weather. During the operation, although much anti-aircraft fire was directed at their aircraft, they obtained valuable information. Three days later Flt. Lt. Dodd and Flt. Sgt. Hill successfully completed another

SERVICE AVIATION

notable reconnaissance, again securing valuable information. This officer and airman have displayed courage and fortitude of a high order.

Bar to Distinguished Flying Cross

Flt. Lt. **A. J. Hancock**, D.F.C., R.A.F.V.R., No. 129 Sqn.—Since the award of the D.F.C., this officer has completed many operational sorties, during which he has destroyed two enemy aircraft and damaged others, bringing his total to seven destroyed. Flt. Lt. Hancock is an inspiring leader.

Act. Sqn. Ldr. **G. J. Cox**, D.F.C., R.A.F., No. 93 Sqn.—Over a long period of operational flying, this officer has displayed conspicuously fine leadership combined with outstanding gallantry as a pilot. At the opening of the campaign for Rome he started the rout of the enemy air forces when he led his squadron against a greatly superior force of Fw 190s which were attempting to attack our ground forces in the Cassino area. Five enemy aircraft were destroyed on that occasion, one of them by Sqn. Ldr. Cox. His squadron continued to play a leading part in the elimination of enemy air opposition, and within a week destroyed eleven more German fighters. Since the award of the D.F.C., Sqn. Ldr. Cox has destroyed at least five enemy aircraft, making a total of nine destroyed and many more damaged. As a squadron commander he has an outstanding record of achievement.

Act. Sqn. Ldr. **R. R. Drew**, D.F.C., R.A.F.O., No. 13 Sqn.—This officer has a distinguished operational record. Since being awarded the D.F.C. he has participated in many more operational sorties. He has led his squadron on numerous hazardous missions, achieving most successful results against such targets as the Terni Power Station and enemy supply dumps. In June, 1944, Sqn. Ldr. Drew was detailed to attack mechanical transport in the Cecina area. *En route* to the target he encountered very adverse weather, twice being forced to turn back. Each time he returned to do battle with the treacherous Cumulo Nimbus peaks towering in places to 15,000 feet. On his third attempt he successfully penetrated this barrier and pressed home his attack in the target area. At all times Sqn. Ldr. Drew has set an inspiring example to the other members of his squadron.

Act. Wing Cdr. **L. E. Leon**, D.F.C., R.A.F.V.R., No. 55 Sqn.—Since Wing Cdr. Leon was posted to command his present squadron he has completed many day and night sorties against a variety of targets, and his consistent good work and personal example have greatly contributed to the successes achieved. On several occasions he has remained over the target area until the arrival of the next formation of aircraft to continue the appointed task.

Flt. Lt. **L. A. Fieldhouse**, D.F.C., R.A.F.V.R., No. 150 Sqn.—Since the award of the D.F.C., this officer has taken part in numerous sorties of a difficult and dangerous nature against targets in Italy and the Balkans. In May, 1944, he completed a particularly daring mine-laying sortie, placing his mines accurately on the River Danube. On another occasion he acted as a flare dropper with skill and precision during an important mission to Bucharest. He has invariably displayed great reliability and resourcefulness.

F/O. **N. D. Cox**, D.F.C., R.A.F.V.R., No. 39 Sqn.—Since the award of the D.F.C., F/O. Cox has completed many sorties and long-range fighter patrols. During one patrol when leading six aircraft he broke up two large formations of enemy torpedo bombers. On another occasion he sighted two enemy merchant vessels. His approach was so skilfully executed that he achieved complete surprise and registered a hit on one of the vessels. The second vessel was damaged by the flying debris of the first. After the attack he evaded intense anti-aircraft fire and flew his damaged aircraft back to base. His keenness to engage the enemy has been an inspiration to his fellow-pilots.

Maj. **W. T. Dalling**, D.F.C., S.A.A.F., No. 21 (S.A.A.F.) Sqn.—Since the award of the D.F.C., Maj. Dalling has completed many sorties. He has flown on a large number of operations and despite adverse weather and heavy enemy opposition has invariably pressed home his attacks with conspicuous success. As a flight commander, his outstanding leadership and devotion to duty have been an inspiration to the junior members of his squadron.

Act. Sqn. Ldr. **R. T. Hudson**, D.F.C., R.A.A.F., No. 450 (R.A.A.F.) Sqn.—As a flight commander, Sqn. Ldr. Hudson has led many successful missions against ground targets and shipping. His bombing accuracy has been of a high order and he has done much damage to enemy installations. Subsequent to his promotion to command of this squadron and the award of the D.F.C., he has continued to operate with courage and the greatest determination, often in the face of intense anti-aircraft fire. His ability in supporting troop movements has been striking, and in certain areas has greatly facilitated the advance of our Army.

Distinguished Flying Cross

Flt. Lt. **G. H. Searle**, R.A.F., No. 680 Sqn.
F/O. **D. O'Leary**, R.A.F.V.R., No. 680 Sqn.
F/O. **E. R. Pearson**, R.A.F.V.R., No. 680 Sqn.
Flt. Lt. **A. L. Brown**, R.C.A.F., No. 216 Sqn.
Flt. Lt. **G. G. Racine**, R.C.A.F., No. 263 Sqn.
F/O. **W. M. Arbuckle**, R.C.A.F., No. 216 Sqn.
Flt. Lt. **W. J. McNicol**, R.C.A.F., No. 435 (R.C.A.F.) Sqn.
Flt. Lt. **J. H. Hooke**, R.A.A.F., No. 3 (R.A.A.F.) Sqn.
Flt. Lt. **L. G. R. Hutt**, R.A.F.V.R., No. 250 Sqn.

CANNON FODDER: R.A.F. armourers loading belts of 20 mm. cannon ammunition into the starboard wing of a Hawker Tempest.

Flt. Lt. **K. R. Patterson**, R.C.A.F., No. 435 (R.C.A.F.) Sqn.
F/O. **M. L. Dubois**, R.C.A.F., No. 550 Sqn.
F/O. **R. B. Gregson**, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
F/O. **H. O. Johnson**, R.A.F.V.R., No. 83 Sqn.
F/O. **F. E. Pringle**, R.A.F.V.R., No. 29 Sqn.
F/O. **E. W. Eaton**, R.A.F.V.R., No. 29 Sqn.
P/O. **R. J. Capon**, R.A.F.V.R., No. 433 (R.C.A.F.) Sqn.
P/O. **J. Surtees**, R.A.F.V.R., No. 435 (R.C.A.F.) Sqn.
P/O. **F. J. Devine**, R.C.A.F., No. 433 R.C.A.F.) Sqn.
P/O. **H. Rumble**, R.A.F.V.R., No. 433 (R.C.A.F.) Sqn.
P/O. **W. H. Wright**, R.C.A.F., No. 435 (R.C.A.F.) Sqn.
W/O.1 **W. G. Kirkwood**, R.C.A.F., No. 409 (R.C.A.F.) Sqn.
W/O.2 **C. N. Matheson**, R.C.A.F., No. 409 (R.C.A.F.) Sqn.
Wing Cdr. **H. V. Humphreys**, R.A.F., No. 57 Sqn.
Sqn. Ldr. **P. R. Clay**, R.A.F.V.R., No. 514 Sqn.
Sqn. Ldr. **D. C. Furse**, R.A.F.V.R., No. 604 Sqn.
Flt. Lt. **J. H. Downes**, R.A.F.V.R., No. 604 Sqn.
Flt. Lt. **W. B. Edwards**, R.A.F.V.R., No. 174 Sqn.
Flt. Lt. **J. H. B. Rollett**, R.A.F.V.R., No. 248 Sqn.
Flt. Lt. **N. F. Brown**, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
Flt. Lt. **H. E. Bridges**, R.C.A.F., No. 77 Sqn.
F/O. **J. M. Calder**, R.C.A.F., No. 235 Sqn.
F/O. **A. J. E. Carter**, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
F/O. **F. N. Chandler**, R.A.A.F., No. 463 (R.A.A.F.) Sqn.
F/O. **D. B. Frost**, R.A.F.V.R., No. 255 Sqn.
F/O. **W. W. Miller**, R.A.F.V.R., No. 248 Sqn.
F/O. **R. Purvis**, R.A.F.V.R., No. 550 Sqn.
F/O. **J. T. Ross**, R.A.F.V.R., No. 255 Sqn.
F/O. **N. Russell**, R.A.F.V.R., No. 235 Sqn.
F/O. **T. C. Scott**, R.A.F.V.R., No. 248 Sqn.
F/O. **D. L. Shield**, R.A.F.V.R., No. 255 Sqn.
F/O. **L. J. Saltmarsh**, R.A.F.V.R., No. 514 Sqn.
P/O. **K. M. Evans**, R.A.F.V.R., No. 429 (R.C.A.F.) Sqn.
P/O. **D. Jackson**, R.A.F.V.R., No. 428 (R.C.A.F.) Sqn.
P/O. **M. N. McLean**, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
P/O. **S. E. M. Milliken**, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
P/O. **N. L. Ulph**, R.A.F.V.R., No. 428 (R.C.A.F.) Sqn.
W/O. **R. C. Campbell**, R.C.A.F., No. 184 Sqn.
W/O. **F. A. Harrison**, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
F/O. **R. C. Etheridge**, R.A.F.V.R., No. 207 Sqn.
Sqn. Ldr. **R. Bannock**, R.C.A.F., No. 418 (R.C.A.F.) Sqn.
Sqn. Ldr. **R. N. Chudleigh**, R.A.F.O., No. 96 Sqn.
Sqn. Ldr. **G. F. Arbuckle**, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
Sqn. Ldr. **M. G. Barnett**, R.N.Z.A.F., No. 501 Sqn.
Flt. Lt. **R. F. W. Cleaver**, D.S.O., R.A.F.V.R.
Sqn. Ldr. **A. Parker-Rees**, R.A.F.V.R., No. 96 Sqn.
Flt. Lt. **J. W. Keller**, R.C.A.F., No. 680 Sqn.
Flt. Lt. **D. L. Ward**, R.A.F.V.R., No. 96 Sqn.
Flt. Lt. **V. S. J. Johns**, R.A.F.V.R.
F/O. **R. L. Beattie**, R.C.A.F., No. 138 Sqn.
F/O. **H. B. Ibbott**, R.A.F.V.R., No. 161 Sqn.
F/O. **P. J. Roy**, R.C.A.F., No. 278 Sqn.
F/O. **G. H. Ward**, D.F.M., R.A.F., No. 136 Sqn.
P/O. **W. R. Stewart**, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
P/O. **W. H. Wardell**, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
W/O. **G. B. Reeder**, R.A.F.V.R., No. 278 Sqn.
W/O. **J. F. Taylor**, R.A.F., No. 138 Sqn.
Wing Cdr. **G. J. C. Paul**, R.A.F., No. 98 Sqn.
Sqn. Ldr. **K. Fisher**, A.F.C., R.A.F.V.R., No. 108 Sqn.
Sqn. Ldr. **A. G. Gardner**, R.A.F.V.R., No. 615 Sqn.
Flt. Lt. **T. O'Gorman**, R.A.F.V.R., No. 279 Sqn.
Flt. Lt. **D. R. Turley-George**, R.A.F.O., No. 251 Sqn.
F/O. **P. Colby**, R.A.F.V.R., No. 226 Sqn.
F/O. **E. Ramsey**, R.A.F.V.R., No. 464 Sqn.
F/O. **G. Stephenson**, D.F.M., R.A.F., No. 107 Sqn.
F/O. **G. W. Williams**, D.F.M., R.A.F.V.R., No. 613 Sqn.
Flt. Lt. **D. E. Noonan**, R.C.A.F., No. 416 (R.C.A.F.) Sqn.
F/O. **A. B. Gillette**, R.C.A.F., No. 140 Sqn.
Flt. Lt. **J. E. Rountree**, R.N.Z.A.F., No. 95 Sqn.
Sqn. Ldr. **T. L. Parry**, R.A.F.V.R., No. 158 Sqn.
Flt. Lt. **F. B. Black**, R.A.A.F., No. 466 (R.A.A.F.) Sqn.
Flt. Lt. **R. J. Feaver**, R.A.F.V.R., No. 51 Sqn.
Flt. Lt. **R. W. S. Rooney**, R.A.A.F., No. 640 Sqn.
Flt. Lt. **G. E. Sanders**, R.A.F.V.R., No. 578 Sqn.
Flt. Lt. **W. L. Turner**, R.A.F.V.R., No. 158 Sqn.
Flt. Lt. **R. C. W. McMullan**, D.F.M., R.A.F.V.R., No. 578 Sqn.
F/O. **J. Care**, R.A.F.V.R., No. 254 Sqn.
F/O. **G. A. Cox**, R.A.F.V.R., No. 254 Sqn.
F/O. **J. C. Hall**, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
F/O. **L. D. Jones**, R.A.F.V.R., No. 640 Sqn.
F/O. **L. E. J. Murphy**, R.C.A.F., No. 427 (R.C.A.F.) Sqn.
F/O. **E. R. Anderson**, R.A.F.V.R., No. 158 Sqn.
F/O. **J. D. F. Cowden**, R.A.F.V.R., No. 158 Sqn.
F/O. **L. Fulker**, R.N.Z.A.F., No. 158 Sqn.
F/O. **B. B. Lindsay**, R.A.A.F., No. 17 Sqn.
P/O. **E. Appleton**, R.A.F.V.R., No. 429 (R.C.A.F.) Sqn.
P/O. **E. E. Collins**, R.A.F.V.R., No. 158 Sqn.
P/O. **G. J. Duggin**, R.A.A.F., No. 83 Sqn.
P/O. **R. J. C. Gilham**, R.A.F.V.R., No. 158 Sqn.
P/O. **W. R. Goodhue**, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
P/O. **J. C. Hoy**, R.C.A.F., No. 158 Sqn.
W/O.1 (now P/O.) **J. J. C. U. Massey**, R.C.A.F., No. 425 (R.C.A.F.) Sqn.

Distinguished Flying Medal

Flt. Sgt. **E. Hill**, R.A.F.V.R., No. 544 Sqn.—For citation see Flt. Lt. Dodd, D.S.O., A.F.C.
Flt. Sgt. **H. E. Madgwick**, R.A.F.V.R., No. 428 (R.C.A.F.) Sqn.
Flt. Sgt. **S. Manierka**, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
Flt. Sgt. **C. Manser**, R.A.F.V.R., No. 101 Sqn.
Flt. Sgt. **A. Massey**, R.A.F., No. 51 Sqn.
Flt. Sgt. **J. E. Masson**, R.A.F.V.R., No. 77 Sqn.
Flt. Sgt. **T. H. J. Meadows**, R.A.F.V.R., No. 428 (R.C.A.F.) Sqn.
Flt. Sgt. **L. W. O'Byrne**, R.A.F.V.R., No. 626 Sqn.
Flt. Sgt. **P. J. Pearce**, R.A.F.V.R., No. 622 Sqn.
Flt. Sgt. **B. R. Phillips**, R.A.F.V.R., No. 100 Sqn.
Flt. Sgt. **L. M. Potter**, R.A.F.V.R., No. 640 Sqn.
Flt. Sgt. **W. F. R. Pountney**, R.A.F.V.R., No. 578 Sqn.
Flt. Sgt. **L. V. Randall**, R.A.F.V.R., No. 166 Sqn.
Flt. Sgt. **H. V. Reed**, R.A.F.V.R., No. 166 Sqn.
Flt. Sgt. **W. Redding**, R.A.F.V.R., No. 626 Sqn.
Flt. Sgt. **J. S. Rennie**, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
Flt. Sgt. **W. J. Robinson**, R.A.F.V.R., No. 41 Sqn.
Flt. Sgt. **E. R. Buck**, R.A.A.F., No. 76 Sqn.
Flt. Sgt. **R. E. Higgins**, R.C.A.F., No. 158 Sqn.
Flt. Sgt. **F. J. Hutchings**, R.C.A.F., No. 103 Sqn.

Flt. Sgt J. E. CAPSTICK, R.A.F.V.R., No. 10 Sqn.
Flt. Sgt. E. CHARLES, R.A.F.V.R., No. 78 Sqn.
Flt. Sgt. F. CONNELL, R.A.F.V.R., No. 51 Sqn.
Flt. Sgt. G. CONNELL, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
Flt. Sgt. R. H. W. COOK, R.A.F., No. 578 Sqn.
Flt. Sgt J. COSGROVE, R.A.F.V.R., No. 432 (R.C.A.F.) Sqn.
Flt. Sgt. J. R. CURTIS, R.A.F.V.R., No. 51 Sqn.
Flt. Sgt. B. DAVIES, R.A.F.V.R., No. 102 Sqn.
Flt. Sgt. P. W. DERHAM, R.A.F., No. 617 Sqn.
Flt. Sgt. J. DICKINSON, R.A.F.V.R., No. 166 Sqn.
Flt. Sgt C. G. F. EDWARDS, R.A.F.V.R., No. 77 Sqn.
Flt. Sgt. E. V EDWARDS, R.A.F.V.R., No. 77 Sqn.
Flt. Sgt. N. ELLISON, R.A.F.V.R., No. 101 Sqn.
Flt. Sgt. B. FISHER, R.A.F.V.R., No. 77 Sqn.
Flt. Sgt. W. V. FRANCIS, R.A.F.V.R., No 166 Sqn.
Flt. Sgt. P. J. GARLAND, R.A.F.V.R., No. 578 Sqn.
Flt. Sgt. K. GILBERT, R.A.F.V.R., No. 156 Sqn.
Flt Sgt L. C. GILMAN, R.A.F.V.R., No. 156 Sqn.
Flt. Sgt. E. H GRIMWADE, R.A.F.V.R., No. 578 Sqn.
Flt. Sgt. W. A. HARRALL, R.A.F.V.R., No. 582 Sqn.
Flt. Sgt. K. W. HARRIS, R.A.F.V.R., No. 156 Sqn.
Flt. Sgt. L. HOPE, R.A.F., No. 619 Sqn.
Flt. Sgt. J. E. HUGHES, R.A.F.V.R., No. 166 Sqn.
Flt. Sgt. H. V. JACQUES, R.A.F.V.R., No. 77 Sqn.
Flt. Sgt. E. KENWRIGHT, R.A.F.V.R., No. 35 Sqn.
Flt. Sgt. A. W. KNAPP, R.A.F.V.R., No. 460 (R.A.A.F.) Sqn.
Flt. Sgt. C. J. G. LAWS, R.A.F.V.R., No. 78 Sqn.
Flt. Sgt. W. W McDONALD, R.A.F.V.R., No. 578 Sqn.

Burma

THE KING has been graciously pleased to approve the following awards in recoguition of gallant and distinguished service with the Royal Air Force during the operations in Burma from June 21st, 1943, to November 15th, 1943 :—

Distinguished Flying Cross

Act Sqn Ldr. F. D. PROCTER, R.A.F.V.R., No. 681 Sqn.
Act. Sqn. Ldr. R. H. REEVES, R.A.F.V.R., No. 681 Sqn.
Flt. Lt. J. B. WALES, R.A.F., No. 28 Sqn.
Flt. Lt. A. B. DUNFORD, R.A.F.V.R., No. 155 Sqn.
F/O. C. V. BARGH, R.N.Z.A.F., No. 67 Sqn.

Distinguished Flying Medal

Flt. Sgt. B. CHRISTISON, R.A.F.V.R., No. 155 Sqn.

Far East

THE KING has been graciously pleased to approve the following awards in recognition of gallantry displayed in flying operations against the enemy in the South-West Pacific area :—

Distinguished Flying Cross

Wing Cdr. G. F. WALKER, R.A.A.F.
Sqn. Ldr. A. R. BRYDON, R.A.A.F.
Sqn. Ldr. G. A. COOPER, R.A.A.F.
Act. Sqn. Ldr. J. A'B. P. BOYD, R.A.A.F.

THE KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services :—

Distinguished Flying Cross

Lt. (temp. Capt.) J. G. EAST, Royal Regiment of Artillery.
Lt. (temp. Capt.) P. H. HENDERSON, Royal Regiment of Artillery.
Lt. (temp. Capt. P. D. MACKLEY, Royal Regiment of Artillery.

THE KING has been graciously pleased to confer "The Efficiency Decoration" upon the following officer of the Territorial Army :—

Maj. R. S. CROOT, Glider Pilot Regiment, Army Air Corps.

Roll of Honour

Casualty Communiqué No. 437.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list 77 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Flt. Lt. W. B. Adams; W/O. A. Allsop; F/O. J. C. Bicknell; Sgt. S. C. Butcher; Flt. Sgt. G. H. McK. Carey; W/O. D. Edwards; Flt. Sgt. D. Flack; Sgt. K. E. A. Fox; Flt. Sgt. P. Frith; P/O. J. S. Gibson; Sgt. J. O. Heath; Sgt. T. A. Hill; Sgt. J. M. Kenrick; P/O. G. A. Kerruish; Sgt. L. G. Leatham; F/O. G. M. McKinlay; Sgt. D. Martin; Sgt. H. J. Morgan; P/O. R. Parfitt; Sgt. T. F. Pitts; Sgt. R. A. Rolph; Sgt. E. J. P. Spink; Flt. Sgt. R. P. Sweet; Flt. Sgt. E. N. Todd; F/O. B. G. Turnidge; Flt. Sgt. F. L. A. White; Flt. Sgt. K. A. White; Flt. Lt. J. Wisbey, D.F.C.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—F/O. L. E. M. Coote; Act. Sqn. Ldr. W. A. Cuddie; Sgt. J. W. Molesworth.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. W. J. Baker; Sgt. H. G. Bannister; Sgt. E. F. M. Barham; Sgt. T. Bell; Act. Flt. Lt. K. Brown, D.F.M.; Flt. Sgt. J. T. Bundle; Sgt. F. B. Collenet; Flt. Lt. G. C. Cooper; Sgt. T. Cubitt; Sgt. T. H. Davies; Sgt. L. J. Dawkins; Sgt. D. E. Day; Sgt. A. MacD. Dick; Flt. Sgt. H. E. M. Dulieu; Sgt. F. J. Fay; P/O. P. Hanavan; P/O. R. Henderson; Sgt. D. E. J. Hobbs; P/O. T. Hoeg; F/O. M. H. Horkheimer; Flt. Sgt. F. A. Hughes; P/O. W. J. Leedham; Sgt. J. P. McAdam; Sgt. N. MacKay, Sgt. L. E. Melbourne; Act. Flt. Lt. R. W. G. Moore; Sgt. J. R. Murray; Sgt. H. Nicol; Sgt. W. J. Patterson; Sgt. P. H. Payne; Sgt. F. G. Peploe; Sgt. E. J. Plumridge; Flt. Sgt. J Prendergast; Sgt. G. V. Sharratt; P/O. N. R. Shaw; Sgt. N. Sidaway; Sgt. F. G. Smith; F/O. S. Smith; Flt. Sgt. J. T. Sullivan; F/O. L. S. Webb.

U-BOAT SPOTLIGHT: The first picture of the "Leigh" searchlight to be released shows it fitted beneath the starboard wing of a Coastal Command Liberator.

WOUNDED OR INJURED IN ACTION.—P/O. W. C Holmes; Sgt. C. Marjoram; Flt. Sgt. T. C. F. Smith; P/O. C. Watkins.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. E. H. Ekins; Flt. Sgt. T. Silverman.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. C. H. Dean; F/O. F. G. Dodd; Sgt. J. S. Francis; Sgt. J. P. Gregory; Sgt. A. E. Holmes; Sgt. R. M. Jordan; Sgt. M. J. MacNaughton-Smith; Sgt J. A. T. Maton; Flt. Sgt D. W. Taylor.

MISSING.—P/O. A. Aiston; Sgt. L. T. Archard; Flt. Sgt. W. F. Asker; Flt. Sgt. J. W. Austin; F/O. S. J. Bailey; Sgt. A. C. H. Baker; Act. F/O. C. Baker; Flt. Sgt. L. P. Barham; Sgt. G. H. Beevers; Flt. Sgt. D. McF. Bell; F/O. W. Birkin; Sgt. E. B. Bland; F/O. K. J. Bunn; Sgt. C. R. Canday; Sgt. D. Carter; Flt. Sgt. T. Charlesworth; Sgt. R. W. Chelu; Sgt. A. J. Chinn; P/O. L. S Clark; Sgt. W. Clark; Sgt. H. W. Collins; Sgt. G. A. Collison; Sgt. D. A. F Coole; Sgt L. A. Critchley; Sgt. D. F. Dales; Flt. Sgt. E. J. Davis; Sgt. L. B. Dawson; Act. Wing Cdr. W. I. Deas, D.F.C.; Flt. Sgt. J. A. G. Dixon; P/O. N. W. Easby; Sgt. D. Egglaston; Flt. Sgt. T. W. Etchells, Sgt. E. W. Everett; P/O. S. Ewart; Act. Flt. Lt G. G. H. Farara; F/O. S. Findley; F/O. G. Fraser; Flt. Sgt. A. Fretwell; Sgt J. Geeves; Flt. Sgt. F. H. Gibberson; P/O. D. Graaf; F/O. K. G. J. Gratton; F/O. A. Griffiths; F/O. F. Griffiths, D.F.C.; Sgt. T. A. Hall; Sgt. H. Hamilton; Flt. Lt. H. R. Hampshire; Sgt. E. E. J. Harris; F/O. F. S. Harris; Flt. Sgt. R. G. Harwood; Sgt. G. A. Hays; Flt. Sgt. H. J. Heavener; Sgt. D. Hetherington; Flt. Sgt. H. H. Hewitt; Sgt. W. Higgins; Flt. Lt. J. R. Hill; F/O. J. S. Hodge; F/O. J. A. Hodgson; W/O. A. Holland; Sgt. J. Horton; Sgt. D. Jagger; P/O. B. R. Jardine; Sgt. J. A. Jillings; Sgt. M. L. Jones; Sgt. S. D. Keenen; P/O. J. Kenny; P/O. R. J. Looke; Flt. Lt. L. McNeill; Flt. Sgt. G. J. O. Martin; Sgt. K. G. Mason; Sgt. W. V. Matthews; Sgt. R. H. Mellard; W/O. A. A. W. Melrose; Sgt. J. M. Moss; F/O. J. C. Murphy; Sgt. R. E. Nineham; Sgt. R. K. Nixon; P/O. R. G Odden; Sgt. E. A. Padley; Sgt. L. A. A. Page; Flt. Sgt. B. H. Potter; Sgt. H. J. F. Pridgett; Sgt. C. B. Prophet; F/O. V. D. Purvis, D.F.C.; Sgt. J. Ratcliffe; Sgt. G. Richards; Sgt. E. P. Richomme; Sgt. K. Robbins; Flt. Sgt. A. Robinson; Sgt. W. F. Schofield; P/O. N. J. W. Scholtz; L.A/C. T. C. Sharp; F/O. L. N. Simpkin; W/O. E. G. Smith; D.F.M.; F/O. R. L. Smith; Sgt. T. Spencer, L.A/C. H. Stott; Sgt. D. Sykes; Flt. Lt. J. MacG. Talman, D.F.C.; F/O. J. T. Taylor, D.F.C.; Act. Sqn. Ldr. G. B. Treasure; P/O. K. A. Underwood; W/O. W. T. Upton, D.F.M.; F/O. T. W. Warwick; Sgt. L. K. Webb; Sgt. R. S. D. Wharton; Sgt. T. B. Whewell; Sgt. W. S. Whyte; Sgt. G. F. Witty; Flt. Sgt. G. F. Wood; Flt. Sgt. W. Worthington; P/O. C. N. Wright.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Cpl. J. G. Stewart; A/C.1 P. G. Sykes.

KILLED ON ACTIVE SERVICE.—Sgt. V. J. T. Allen; L.A/C. G. C. Best; Sgt. K. W. Chantrell; F/O. D. J. Coffee; Flt. Sgt. J. Fenwick; Sgt S. Heron; Sgt. J. E. Hills; Cpl. A. R. Jenkins; Act. Flt. Lt. G. F. Lindsay; A/C.2 E. Naylor; L.A/C. H. Peel; Flt. Lt. R. M. Shardlow; L.A/C. R. Waller; Flt. Sgt. W. P. Wickham; L.A/C. D. Wood; Flt. Lt. R. A. Wood; Flt. Sgt. J. F. Woolley.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. K. A. Alexander; Sgt. T. Ashcroft; Sgt. A. McN. Davidson; Flt. Sgt. W. L. Jones; A/C.2 J. Marshall; A/C.1 W. Ritchie.

WOUNDED OR INJURED ON ACTIVE SERVICE.—A/C.2 R. E. Boughton; Flt. Lt. D. Caminer; A/C.2 F. C. Cheetham; Cpl. G. A. S. Davies; A/C.2 A. P. Dawson; L.A/C. S. J. Edwards; A/C.2 R. C. Fuller; F/O. E. A. H Lawrence; A/C.2 C.S. McCrickard; L.A/C. W. Murphy; Cpl. G. Thomson; P/O. W. Thornton.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—L.A/C. F. H. Dann.

DIED ON ACTIVE SERVICE.—A/C.1 G. A. Brodrick; A/C.2 W. J. Godsell; A/C.1 C. E. Goodwin; A/C.1 A. M. Greenwood; Cpl. J. M. Hart; L.A/C. J. R. Humphrey; A/C.1 G. D. Nethery; L.A/C. J. S. Tennent; Flt. Sgt. E. Walker.

Women's Auxiliary Air Force

KILLED ON ACTIVE SERVICE.—A/CW.2 M. E. Collier; A/CW.1 H. P. I. Cox; A/CW.1 M. J. Hind; Cpl. D. Padley.

Royal Australian Air Force

KILLED IN ACTION.—Flt. Sgt. B. G. Lee.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. C. K. Bolger; F/O. S. V. Cole; P/O. A. Long; P/O. R. E. Peate; Flt. Sgt. D. M. Rutter.

WOUNDED OR INJURED IN ACTION.—Flt. Sgt. R. G. Peters.

MISSING, BELIEVED KILLED IN ACTION.—F/O. W. M. Barbour.

MISSING.—Flt. Sgt. V. E. Cockroft; W/O. W. J. Cooper; F/O. G. B. Edwards; P/O. R. B. Groves; F/O. G. E. Heath, D.F.M.; F/O. D. E. Higgs; W/O. C. C. Jones; Flt. Sgt. W. D. D. Killworth; F/O. H. K. Nunn; Flt. Sgt. L. R. Pearson; F/O. K. Pond; Flt. Sgt. L. H. Porritt; P/O. P. W. Ryan; F/O. J. A. Saint-Smith, D.F.M.; Flt. Sgt. J. P. Steffan; W/O. J. H. Stibbard; P/O. D. McN Thomson; W/O. W. D. Webster.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. R. O Harvey.

Royal Canadian Air Force

KILLED IN ACTION.—F/O. H. E. Fenwick, D.F.C.; Flt. Sgt. J. J. Godin; Flt Lt. C. D. Grant; Sgt. W. R. Stevens.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Lt. G. Low.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—W/O. B. M. Bervel;

SERVICE AVIATION

D.F.M.; W/O. H. E. Bradley; Sgt. J. S. D. Candlerwood; P/O. R. F. Crewe; F/O. H. A. Danniger; F/O. R. C. East; Flt. Lt. L. C. Gosling, D.F.C.; Flt. Sgt. R. D. Hayes; Sgt. R. G. James; Sgt. R. C. McLellan; W/O. J. E. Morrison; Flt. Sgt. A. J. E. Perron; Sgt. C. H. Pratt; P/O. D. C. Rundle; F/O. G. A. Shannon; F/O. J. A. Studer; P/O. D. B. Surrette; Flt. Sgt. G. A. Usher.

WOUNDED OR INJURED IN ACTION.—Flt. Sgt. D. R. Bacon; Sgt. W. R. Burton; F/O. R. G. Driver.

MISSING, BELIEVED KILLED IN ACTION.—F/O. S. W. Cook; P/O. T. G. Hart.

MISSING.—F/O. R. H. Bannihr; W/O. J. R. Bigham; F/O. A. J. Black; W/O. W. A. Cauthers; Flt. Lt. B. F. Cleeton; F/O. K. McR. Collins; Flt. Sgt. C. C. Gilchrist; F/O. W. J. Gladwell; F/O. M. M. Golub; F/O. G. A. Jamieson; F/O. H. K. Jones; F/O. S. J. McGrath; F/O. G. H. McLaren; P/O. D. H. Mason; F/O. A. E. May; F/O. J. H. Morrison; W/O. A. R. Mumford; P/O. N. P. Murphy; F/O. W. G. O'Hagan; F/O. S. J. Queen; W/O. A. J. Ryan; F/O. E. A. Salomaa; F/O. J. T. Sammon; Flt. Sgt. J. J. Scully; P/O. J. Sibbald; Sgt. A. H. Siemens; F/O. J. W. Stapleton; W/O. W. H. Tomlinson; F/O. R. G. Viau; Sgt. R. J. Walton; Flt. Sgt. J. C. Willson.

KILLED ON ACTIVE SERVICE.—F/O. J. C. Dalziel.

DIED ON ACTIVE SERVICE.—Cpl. J. Law.

Royal New Zealand Air Force

KILLED IN ACTION.—P/O. R. J. Wright.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. M. L. Bartley.

MISSING.—F/O. K. W. Jones.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—W/O. R. R. J. Simpson.

South African Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Act. Flt. Sgt. J. J. Coughlan.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Flt. Sgt. C. W. Lehmac.

MISSING, BELIEVED KILLED IN ACTION.—2/Lt. M. J. W. Brummer.

KILLED ON ACTIVE SERVICE.—Lt. Van der Westhuizen; Air Mech. J. H. Yeates.

Casualty Communiqué No. 438

Of the names in this list 79 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—W/O. B. J. Adams; Flt. Sgt. H. H. Ashby; Sgt. J. Butterworth; W/O. J. B. Duggan; W/O. D. G. Fairey; Sgt. G. M. Fisher; Sgt. C. S. A. Graves; P/O. J. W. Hall; Flt. Sgt. G. A. Holloway; F/O. I. B. Jenkins; Sgt. C. C. Kinvig; Flt. Sgt. J. F. Leonard; Sgt. H. G. Lewis; Flt. Sgt. R. A. Neale; W/O. R. R. J. Revell; Sgt. R. W. Smart; Sgt. W. H. Wilson.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Lt. A. G. S. Anderson; Flt. Lt. A. M. Cameron; Sgt. T. C. Henderson; F/O. G. Ingram; Sgt. A. I. Leslie; Flt. Sgt. C. V. Proud; P/O. D. G. Williams.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. O. W. St. C. Alleyne; Flt. Sgt. G. W. Allso; Sgt. T. J. Barrett; Sgt. F. W. Bate; Sgt. T. W. Blanc; Sgt. R. Blanchard; Sgt. G. J. P. Boyd; Flt. Lt. D. E. Caudrey; F/O. P. A. Chappell; Sgt. M. D. Chasmar; Sgt. R. Cornwell; Sgt. J. M. Day; Sgt. E. V. A. Elder; Flt. Sgt. J. K. Gale; Sgt. L. T. Graham; Flt. Sgt. R. E. Hedges; Flt. Sgt. G. J. T. Horton; Sgt. E. W. Howell; Sgt. J. McG. Hughes; Sgt. R. Inglis; Sgt. J. Jackson; Sgt. H. G. Jones; Sgt. M. J. Jones; Sgt. G. E. Kendall; Sgt. P. G. Kirby; Sgt. C. MacLean; Sgt. A. B. McLelland; F/O. E. S. Marsh; P/O. A. J. Matthews; Sgt. G. Merrill; Sgt. G. R. Potter; Flt. Sgt. J. K. Prudhoe; Sgt. M. Punshon; P/O. D. A. Richardson; Flt. Sgt. G. V. Rogers; Sgt. T. P. Rowlands; Sgt. J. G. Smith; Sgt. J. Sneddon; Flt. Sgt. D. Stanton; Sgt. D. H. Strong; Flt. Sgt. E. S. Taylor; Act. Sqn. Ldr. P. G. Thornton-Brown; Flt. Sgt. C. F. Walton; Flt. Lt. F. C. Webb, D.F.M.; Sgt. R. H. Wells; Sgt. G. E. Williams; Sgt. J. Woolman; Sqn. Ldr. N. W. Wright; Sgt. J. A. Young.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—F/O. A. K. Barry.

WOUNDED OR INJURED IN ACTION.—F/O. R. Hems; Sgt. P. W. J. McDevitt.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. D. G. S. McCartney; F/O. C. A. Rowland; Flt. Lt. G. J. C. Williams; Sgt. D. J. Wright.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. S. J. Abbott; Flt. Sgt. N. W. Brown; Sgt. D. A. K. Davison; Act. Flt. Lt. J. A. Edward, D.F.C.; Sgt. S. Holt; Flt. Sgt. F. G. Roberts, D.F.M.

MISSING.—Sgt. B. C. Acourt; W/O. R. W. Arg, D.F.M.; Sgt. J. D. Archer; Sgt. A. Barber; Flt. Sgt. P. S. Barton; Flt. Lt. R. F. Bass; Flt. Sgt. B. D. Beddison; Sgt. J. E. Beeson; Sgt. D. H. Beresford; W/O. R. W. G. Bryant; Sgt. P. A. Budd; P/O. R. W. Burkwood; Flt. Lt. P. K. Burley, D.F.C.; Act. Flt. Lt. R. F. Carnegie; Sgt. V. Charles; Sgt. W. Coates; Sgt. R. F. Coleman; Sgt. D. Daley; Flt. Sgt. J. Datson; F/O. K. Davis; Sgt. L. A. Dolby; Sgt. P. C. Dolman; Sgt. P. Donoghue; Flt. Sgt. A. D. Eagle; Sgt. F. C. Edwards; Sgt. D. A. G. Ellicott; Flt. Sgt. A. Finn; Sgt. A. S. Fordham; Sgt. G. E. Frost; Sgt. A. J. Gasser; Sgt. R. W. P. Gilliham; Flt. Sgt. R. L. Givens; Flt. Sgt. C. W. Greenaway; Sgt. C. L. Hagger; Flt. Sgt. J. E. Halshaw; Sgt. J. Hare; P/O. I. W. Harland; Sgt. G. Harrison; F/O. M. G. Harrison; Flt. Sgt. R. S. Hartley; Sgt. N. H. Hodson; Sgt. K. A. Horswell; Sgt. S. B. Howell; Sgt. L. J. H. Hutchinson; P/O. N. A. Ireland; Flt. Sgt. S. Isherwood; F/O. J. G. Jennings; Flt. Sgt. E. F. Jones; Sgt. J. E. Jones; Sgt. B. W. Joyce; Sgt. J. Kennedy; F/O. L. W. J. King, D.F.C.; P/O. K. G. Kingerlee; F/O. J. C. Lelliott; Sgt. D. E. Leslie; Sgt. R. L. Leverington; Sgt. H. A. Lewarne; Flt. Sgt. A. J. Lewis; Sgt. J. Lewis; Flt. Sgt. S. R. Lewis; Flt. Sgt. J. A. Ingertwood; Sgt. G. S. Lind; Sgt. R. P. Lucas; Sgt. W. A. McDougall; W/O. W. W. McKeown; P/O. R. J. Messer; P/O. E. W. Morgan; Sgt. S. E. Munslow; F/O. H. R. Murray; Sgt. D. W. Nicholls; Flt. Sgt. R. Oswald; W/O. H. J. Phillip; Flt. Lt. J. D. Phillips; Sgt. C. F. Poole; Sgt. F. S. Rawson; F/O. G. D. Rees; W/O. A. J. Richardson; P/O. H. Rogers; F/O. R. A. Rosen; Sgt. R. H. Salmons; F/O. R. Sanford; Sgt. R. H. Sargent; Sgt. N. H. Shergold; Sgt. G. E. Snelling; Act. Sqn. Ldr. A. Sudden, D.F.M.; Flt. Lt. R. N. Tapley; Sgt. A. F. Taylor; Flt. Sgt. A. G. Thomson; Sgt. T. W. H. Tomlinson; P/O. A. J. Weaver; Sgt. W. H. Wells; Flt. Sgt. W. F. Wicks; P/O. K. N. Wiggins; W/O. G. A. Williams; P/O. L. Williams; Sgt. T. H. Williamson; Flt. Sgt. H. C. Williamson-Rattray; Sgt. R. Woodrow.

KILLED ON ACTIVE SERVICE.—A/C.1 J. Baines; Sgt. L. W. Barker; Cpl. D. L. Bartlett; W/O. S. Bickell; Sgt. J. Bolter; Sgt. R. F. Bradford; A/C.2 W. J. Cattle; Sgt. I. A. Checkley; Flt. Lt. K. Clegg; Sgt. P. R. Davis; Sgt. A. R. Earl; L.A/C. J. O. Ellis; Flt. Sgt. A. H. Fry; Sgt. B. Hadlow; Cpl. C. W. Happs; Flt. Sgt. R. G. T. Hide; A/C.2 C. D. Hughes; Act. Flt. Lt. D. Hughes, M.B.E.; Flt. Sgt. J. E. Kay; Sgt. H. Kinchin; Flt. Lt. C. S. Lain; L.A/C. A. Lazarus; Sgt. J. B. Lemon; L.A/C. H. S. MacLagan; W/O. T. J. Malone; P/O. L. C. Miller; Sgt. W. N. Mitchell; A/C.1 S. Parsons; Sgt. K. L. Popejoy; A/C.2 K. Raisbeck; P/O. C. F. Searles; Flt. Lt. J. Shaw; Cpl. G. J. Sloman; Sgt. W. E. C. Willett; Sgt. P. J. Woods; Sgt. C. A. Wyatt.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED ON ACTIVE SERVICE.—Act. Flt. Sgt. J. Williams.

WOUNDED OR INJURED ON ACTIVE SERVICE.—A/C.2 W. Hunter; L.A/C. S. A. Page; W/O. J. K. Sidebottom; L.A/C. W. B. Williams; Flt. Lt. M. De L. Wilson.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—P/O. W. M. Henry; A/C.2 M. E. Hinds; Flt. Lt. H. Hopkins; Flt. Sgt. H. W. Powter.

DIED ON ACTIVE SERVICE.—Act. Flt. Lt. R. G. Barton; Sgt. D. L. Cheney; Cpl. D. Humphries; A/C.2 L. Marshall; Flt. Lt. S. D. Osborn; A/C.1 F. W. Parrott; Cpl. J. E. Surgey.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Flt. Sgt. D. C. O'Donnell; Sgt. G. W. Green.

Women's Auxiliary Air Force

KILLED ON ACTIVE SERVICE.—A/CW.2 M. Haddock; L.A/CW. A. M. Henderson; L.A/CW. V. Jones.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. P. M. Brook; Act. Sqn. Ldr. A. S. Cook, D.F.C., D.F.M.; Flt. Sgt. S. E. Jackson; Flt. Sgt. C. L. Robinson; Sgt. J. P. Sheridan; Flt. Sgt. C. R. Thurston; W/O. W. M. Waterman; Flt. Sgt. K. J. Wilkes.

WOUNDED OR INJURED IN ACTION.—F/O. E. F. Collaery; P/O. A. T. Field.

MISSING.—Flt. Sgt. N. D. Campbell; P/O. R. T. Collins; Flt. Sgt. F. E. M. Crawford; Flt. Sgt. R. C. Dalton; W/O. K. J. Hiskins; P/O. E. J. Holmes; Flt. Sgt. R. D. McA. Howden; Flt. Sgt. M. W. Marsh; Flt. Sgt. N. A. Pardon; Flt. Sgt. G. G. Parker; P/O. L. C. Potter; W/O. A. W. Pryor; Flt. Sgt. W. R. Vokes; P/O. J. E. F. Wall.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. O. E. Ferguson; Flt. Lt. A. W. Fraser, D.F.C.; Flt. Sgt. W. A. Sheppard; F/O. D. Smith.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. J. A. Kingamill.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Flt. Sgt. J. P. S. Dalton.

Royal Canadian Air Force

KILLED IN ACTION.—Sqn. Ldr. W. B. Anderson; F/O. D. H. Baker; W/O. J. A. Fraser; W/O. G. W. Gerring; Sgt. W. Gowans; W/O. F. G. Logan; F/O. J. F. Ollett; F/O. F. MacD. Thomas; W/O. W. C. Wallace.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. A. Bortolussi; F/O. J. R. Dale; Sgt. D. B. Fulton; Flt. Sgt. E. H. W. Griffin; F/O. C. G. McDonald; W/O. K. G. Smalley; Flt. Sgt. J. A. O. Strachan.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—W/O. G. J. Crebbin; Sgt. C. H. Wardrope.

WOUNDED OR INJURED IN ACTION.—Flt. Lt. G. R. Bernier; Flt. Sgt. E. B. Hudson.

MISSING, BELIEVED KILLED IN ACTION.—W/O. H. Haydes; F/O. L. E. Park.

MISSING.—P/O. D. E. Aiken; F/O. W. L. Baker; F/O. F. H. Bryon; F/O. K. Davis; P/O. W. J. Gramson; F/O. J. I. Johnston; P/O. J. Kramer; F/O. J. L. Lanfranchi; F/O. A. MacM. Hoar; Sgt. D. O. Munson; Flt. Sgt. L. S. O'Leary; F/O. L. K. Owen; P/O. T. W. F. Price; P/O. H. O. Rae; Sgt. F. L. Rey; W/O. R. A. Riddoch; Flt. Lt. G. R. B. Roe; Flt. Sgt. H. T. Rogers; Flt. Sgt. A. M. Simmons; F/O. J. R. Steepe; F/O. T. W. Thompson; W/O. R. G. Wallace; W/O. J. Wilson; W/O. R. J. Wilson; F/O. V. F. Wunsch; Sgt. V. Zulinov.

KILLED ON ACTIVE SERVICE.—F/O. R. J. Andrews; Sgt. W. H. Clark; P/O. A. G. Corck; F/O. M. A. Foy; F/O. H. W. Garwood; Sgt. A. A. Goodill; F/O. A. P. Haacke; F/O. W. Haraczay; W/O. A. C. Leadbeater; Sgt. A. H. MacKimmie; W/O. J. M. G. Plante; P/O. L. A. Scutt; Sgt. J. B. Sollie; P/O. C. E. Stephen; F/O. P. W. Tokar; F/O. R. P. Vatcher.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. F. I. Kirkwood

Royal New Zealand Air Force

KILLED IN ACTION.—W/O. H. G. Coombe; W/O. D. A. Orr.

MISSING.—Flt. Lt. N. Cornish.

South African Air Force

MISSING.—Capt. D. Judd; Lt. J. E. Sharpe.

KILLED ON ACTIVE SERVICE.—2/Lt. H. Dewet.

IRRAWADI JIG-SAW : An Indian W.A.C.(I) pieces together an overlap photograph taken by R.A.F. reconnaissance aircraft over Burma. These W.A.C.(I)s are equivalent to our W.A.A.F.s.

SERVICE AVIATION

Casualty Communiqué No. 439

Of the names in this list 77 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Flt. Sgt. E. L. Bishop; Flt. Sgt. G. T. Bishop; Sgt. R. F. Burgess; F/O J. C. Dickson; Flt. Sgt. G. F. Emery; P/O. R. E. Farrow; Flt. Sgt. J. E. D. Fee; P/O. N. Hilton; Flt. Sgt. M. F. Hoare; Sgt. K. H. Johnston; Flt. Sgt. W. C. McK. Montgomery; F/O W. Reid; Sgt. I. E. Smith; Flt. Sgt. H. F. Whalen.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. D. W. Angell; Sgt. F. E. Ashman; Sgt. H. Bronsky; W/O. R. Brunt; Sqn. Ldr. A. V. Gowers, D.F.C.; Flt. Sgt. G. Miller; Sgt. R. W. Norley; Sgt. E. D. Wilson.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. G. F. Austin; Sgt. W. Bell; Sgt. R. Bennett; Sgt. J. H. Brown; Sgt. W. Buckton; Flt. Sgt. S. Burns; Sgt. D. S. K. Chappell; Sgt. G. V. Cook; Sgt. V. A. Deacock; Sgt. T. Deacon; Flt. Sgt. W. A. Dearman; Sgt. L. G. Doughty; Sgt. R. E. Dykes; Flt. Sgt. A. Fieldhouse; Sgt. R. A. Ford; P/O. F. J. Fry; Sgt. A. E. Gadsby; Flt. Sgt. W. F. Garrod; Flt. Sgt. J. A. B. Gray; Flt. Lt. F. M. C. Guest, D.F.C.; Flt. Sgt. A. F. Halsted; Sgt. L. Harrett; Sgt. W. A. Hart; Sgt. W. C. Havercroft; Sqn. Ldr. J. E. R. Hayter, D.F.C.; Sgt. R. W. Heaton; Sgt. S. F. Hone; F/O. A. J. Horobin; Sgt. P. H. Johnson; Sgt. E. C. Kent; Sgt. R. F. Lee; Sgt. E. K. Leeves; Sgt. H. Lindsay; F/O. R. MacFarlane; Flt. Sgt. T. W. Maynard; P/O. K. Painter; Sgt. C. F. Paish; Sgt. T. G. Palgrave; Sgt. H. R. J. Richardson; Sgt. R. F. Ricketts; Sgt. A. P. Royse; Sgt. A. F. Simpson; Flt. Sgt. E. C. Smith; Flt. Sgt. G. S. Steer; Flt. Sgt. E. W. Sykes; Sgt. K. G. Taylor; F/O. R. H. J. Tozer; Sgt. W. Voss; Sgt. C. Wharton; Sgt. S. Williams; P/O. A. F. Wright.

WOUNDED OR INJURED IN ACTION.—Flt. Sgt. S. V. D. Brown; F/O. J. A. Cruickshank; Flt. Sgt. K. W. Fox.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Flt. Sgt. R. L. Short.

MISSING, BELIEVED KILLED IN ACTION.—F/O. H. G. Benson; Flt. Sgt. J. Blackburn; Sgt. K. S. Clelland; Sgt. W. R. Melling; Act. Wing Cdr. A. D. Phillips, D.S.O., D.F.C.; Flt. Sgt. W. W. Scott; W/O. F. Warner; Flt. Sgt. H. O. Williams.

MISSING.—Sgt. K. Adams; Sgt. J. Anderson; Sgt. N. Barker; Sgt. R. Black; Sgt. J. R. Breeze; Sgt. N. W. Brown; Sgt. E. E. Brownhall; Flt. Lt. P. R. Burt, D.F.C.; F/O. J. W. Campbell; Flt. Sgt. L. H. Chalice; F/O. L. A. Chandler; P/O. H. G. Chapman; Act. Sqn. Ldr. A. P. Cranswick, D.S.O., D.F.C.; L.A/C. J. H. Crofts; Flt. Sgt. G. Croydon; Flt. Sgt. E. McH. Davies; Flt. Sgt. H. Davison; Sgt. J. Davison; Flt. Sgt. N. Dixon; Flt. Sgt. H. E. Dobson; F/O. M. L. Dodd; F/O. W. T. Dryburgh; Flt. Sgt. P. Ebsworth Donkin; F/O. J. F. Ellis; Sgt. C. Erickson; P/O. M. Evans; Sgt. J. Fingleton; Flt. Sgt. C. M. Firth; Flt. Sgt. J. E. Fisher; Sgt. R. Fitch; Flt. Lt. A. C. Flood; Flt. Lt. E. W. Forwell, D.F.C.; Sgt. L. A. W. Francis; Sgt. R. Furlong; P/O. M. H. Gill; Sgt. T. T. Golding; Sgt. J. T. W. Goodwin; Sgt. N. E. N. Green; W/O. H. E. L. Griffiths; Sgt. R. Grimshaw; Flt. Lt. F. L. Grimwood; Sgt. J. E. Gunton; Sgt. C. A. Hallett; Flt. Sgt. F. W. Halsey; Sgt. G. E. Hamoniaux; Flt. Sgt. T. C. Hardwick; Flt. Sgt. L. T. Harman; P/O. J. R. Harmer; Sgt. T. W. Hunt; Sgt. C. Hymas; Sgt. R. V. Ind; Flt. Sgt. D. Joyce; F/O. R. H. Kille; F/O. J. H. Lamb; Sgt. K. Lovatt; W/O. R. Lowe; Sgt. R. W. Lucas; Sgt. T. H. McCaffrey; P/O. A. L. McKenzie; Flt. Sgt. C. McRobb; Sgt. J. Marwood; Sgt. J. Matthews; Sgt. D. D. Moffatt; F/O. F. McK. Morrison; Sgt. B. L. Munday; Sgt. B. Naylor; Sgt. K. Nelson; Sgt. H. Newell; F/O. F. B. Newmarch; Sgt. D. F. Newsham; Sgt. J. M. C. Oakley; Sgt. H. J. P. O'Brien; Sgt. M. Ord; Sgt. W. N. Partridge; Sgt. R. Penny; Sgt. E. K. Phelps; F/O. W. W. Preston; Sgt. J. Rae; F/O. D. F. Rayment; W/O. A. T. Redfern; Flt. Lt. W. E. Reynolds; Act. Sqn. Ldr. W. C. Riches, D.F.C.; P/O. K. Robinson; Sgt. A. D. Roper; Flt. Sgt. J. Rowe; Act. F/O. A. J. Sargent; Sgt. R. G. Seddon; Flt. Sgt. J. G. Shaw; Flt. Sgt. M. J. Simonds; P/O. K. R. E. Spencer; Sgt. J. C. L. Stacey; F/O. C. E. Stamp; Sgt. C. Stapleton; Sgt. D. A. Stephens; Sgt. R. Syratt; Act. Flt. Lt. A. C. M. G. Taylor; Flt. Sgt. K. F. Thomas; F/O. B. W. Thynne; Flt. Lt. J. D. Vaizey, D.F.C.; P/O. G. S. Waddell; Flt. Sgt. J. W. Wales; F/O. J. C. Warnock; Sgt. J. C. Watkins; Act. Flt. Lt. H. W. D. Watts, D.F.C.; Sgt. F. J. Webb; Flt. Sgt. H. G. West; P/O. J. H. Wilson; Sgt. D. Withers; Sgt. K. Withnall; F/O. L. Wolfson; Flt. Sgt. A. H. Wood; Sgt. J. W. Wood; P/O. F. B. Woodman; Sgt. J. E. G. Woodward; Flt. Sgt. W. F. Worsley; Flt. Sgt. H. E. Yorke; Sgt. R. D. B. Younger.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Sgt. A. C. Connor.

KILLED ON ACTIVE SERVICE.—W/O. D. P. Aiken; Sgt. H. Ashwell; Sgt. B. A. Barker; P/O. E. Barley; Sgt. G. Beedle; Flt. Sgt. A. A. Birt; W/O. R. Burns; A/C.2 A. G. Cowie; A/C.2 A. E. Day; W/O. L. A. W. J. Eccles; A/C.2 J. F. Ellis; Sgt. H. Fryer; A/C.2 H. Graham; Sgt. F. G. Grieve; Flt. Lt. J. V. Heptinstall; F/O. A. C. H. McConnell-Jones; Flt. Lt. B. E. McLaughlin, D.F.C.; W/O. L. W. Mickleborough; Flt. Sgt. D. Myers; Flt. Sgt. R. W. Roberts; Sgt. I. H. Simonds; Sgt. P. Sturdy; Flt. Sgt. H. Tatchell; W/O. A. A. Webber; Flt. Lt. J. Wilmer.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. C. A. Clark; Sgt. J. A. Gouk; Sgt. R. Leybourne; Sgt. D. Wigglesworth.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt. D. Abbotts; F/O. P. R. Cubitt; L.A/C. H. Fowler; Sgt. L. R. G. Gerry; P/O. C. Jones; Sqn. Ldr. H. T. Morgan; Flt. Lt. R. H. Thomas, A.F.C.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. P. Morrissey.

DIED ON ACTIVE SERVICE.—Cpl. T. C. Chapman; L.A/C. K. B. A. Collins; Sgt. C. G. Courtney; L.A/C. S. A. Covey; Flt. Sgt. L. S. C. Jackson; Cpl. J. Kalaher; Cpl. S. H. Kirby; Sgt. P. E. Laxton; Cpl. A. McFarlane; A/C.1 J. B. Mayes; Sgt. J. B. Melrose; A/C.1 K. G. Noton; Flt. Sgt. T. C. Petty; A/C.1 D. R. Rappitt; Cpl. F. C. Ratliff; Flt. Sgt. H. F. Siebert; W/O J. Taylor; L.A/C. R. Westthorpe; A/C.1 R. H. Wise; A/C.2 V. E. Wood.

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—L.A/CW. G. J. Dannatt.

Royal Australian Air Force

KILLED IN ACTION.—P/O. W. E. Atkinson; Act. Sqn. Ldr. W. W. Blessing, D.S.O., D.F.C.; P/O. N. J. W. Smith.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. R. P. O'Dea.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. H. E. Burbridge; Sgt. L. A. Saunders; Act. Flt. Lt. H. W. Skinner; Flt. Sgt. K. McR. Smith.

MISSING, BELIEVED KILLED IN ACTION.—F/O. E. C. Radford.

MISSING.—Act. F/O. D. Beharrie; Flt. Sgt. J. C. B. Boydell; P/O. J. Costello; Flt. Sgt. A. W. G. Fripp; F/O. B. H. Gifford; Flt. Sgt. P. J. Pearce; Flt. Sgt. F. R. Rogers; Flt. Sgt. K. J. Schott; W/O. R. G. Shipway; Flt. Sgt. F. G. Spencer; Act. F/O. J. R. Worthington.

KILLED ON ACTIVE SERVICE.—F/O. J. U. Bailey; Flt. Sgt. J. N. Bond; F/O. T. O. Edwards; P/O. F. C. H. Jones; Flt. Sgt. L. K. Maxwell; Sgt. A. W. Shiels; Flt. Sgt. R. B. Sterling; Flt. Sgt. R. A. Wixted.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Act. Sqn. Ldr. J. C. Doyle, D.F.C.

MARCH PAST : A section of men of the R.A.F. Regiment pass a Dakota as they go on guard at a forward airfield on the Arakan front. A Beaufighter is seen in the background.

Royal Canadian Air Force

KILLED IN ACTION.—W/O. C. J. McConvey; Flt. Lt. H. C. Monnier; F/O. E. S. Simonson; F/O W. A. Smart.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. W. C. Davidson; P/O. J. M. C. LaLonde; Flt. Sgt. K. H. McLean; Flt. Sgt. D. H. McLeod; F/O. J. B. Reeves; Flt. Sgt. C. A. Tweedle.

MISSING.—Flt. Lt. H. J. Cleary; F/O. A. A. Desilets; F/O. A. G. Echlin; F/O. A. Forsyth; Flt. Lt. T. H. O. Hallihan; Flt. Lt. S. B. Huppert; F/O. R. E. Lee; F/O. R. W. McLaren; F/O. L. B. Mollard; F/O. J. E. Taylor.

KILLED ON ACTIVE SERVICE.—Sgt. J. C. Anderson; Flt. Lt. J. D. Best; Sgt. G. D. Britland; Sgt. R. L. Buckberrough; F/O. F. K. Burleigh; Sgt. D. F. Connolly; F/O. W. A. Corley; Sgt. T. Gabryelski; F/O. R. J. Gray; Sgt. N. H. Groh; Sgt. J. W. Johnston; Sgt. G. A. Jones; Sgt. N. J. Kidney; F/O. J. P. Kolomic; Sgt. D. W. MacKinnon; W/O. F. S. Marcellus; Sgt. W. Marshall; W/O. R. K. Moore; P/O. E. A. Shaw; Sgt. R. F. Simmons; Sgt. G. A. Smirl; F/O. G. L. Smith; P/O. J. W. Staples; F/O. W. A. Tees; F/O. J. A. Thompson; F/O. W. S. Waychuk; F/O. A. S. Woolaver; Sgt. J. T. Yeomans; F/O. V. Zoratti.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—F/O. D. J. Rioux.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. S. W. Riddler; P/O. W. B. Tyerman.

MISSING.—W/O. H. D. Parker.

KILLED ON ACTIVE SERVICE.—P/O. J. T. Ayton; Sgt. C. E. Bush.

South African Air Force

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Capt. R. K. Dunkerley.

DIED ON ACTIVE SERVICE.—Air Mech. A. J. Reyneke.

Official Corrections

Casualty Communiqué No. 436.

Under "MISSING" delete Sgt. J. W. Carey, Sgt. C. C. Hatter, F/O. J. R. Maunsell and Flt. Lt. D. C. Saunders.

R.A.A.F., under "MISSING" delete Flt. Sgt. D. R. Foden.

R.C.A.F., under "MISSING, BELIEVED KILLED IN ACTION," for Sgt. J. E. R. Bowering read P/O. J. E. R. Bowering.